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PATHOLOGY OF ARTIFICIALLY INDUCED SCURVY IN THE MONKEY—WITH AND WITHOUT CHRONIC CALCIUM DEFICIENCY [1]

By T. H. TOMLINSON, Jr., *Passed Assistant Surgeon, United States Public Health Service*

The methods of procedure and the clinical results obtained in their experiment have been outlined by Fraser (*1*) and Fraser and Topping (*2*). Reported briefly here are the results of the pathological examination, both gross and microscopic, of the 18 Rhesus monkeys, *Macaca mulatta*, sacrificed from their group. At the end of 11 months, 6 of their 12 control animals, 2 from stock diet and 4 from the group on the synthetic control diet, were killed, together with the 4 on the low vitamin C intake diet, 2 on the calcium deficient diet, and the 4 on the diet containing inadequate amounts of both vitamin C and calcium. At the end of 18 months, the 2 remaining monkeys on the low calcium intake were killed.

All animals were autopsied soon after death, and a careful dissection and gross study were made. All organs were weighed, and careful search was made for signs of old or recent hemorrhage. Since some of the animals had shown exophthalmos, the orbits were explored. Joints which showed any evidence of being involved during life or on superficial examination were carefully dissected. In all animals the minimum examination included both temporomandibular joints, one knee, and one shoulder joint. Where there was extensive involvement the bones were cut some distance on each side of the joint and the joint removed intact with the adjacent periosteum, tendons, and muscle undisturbed. Since this involvement in some cases was extreme, with separation of the head of the bone and elevation of the periosteum, the bones and joints were sufficiently hardened in formaldehyde to prevent tearing and distortion and then were sawed in half longitudinally.

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[1] From the Division of Pathology, National Institute of Health.

In the more involved regions of the gingiva, the lateral alveolar bone plate sometimes was quite thin, showing moderate to marked resorption along the inner surface and across the crest; near the latter it was separated from the tooth by a wide zone of granulation tissue. Very rarely, elsewhere, usually near the tooth, were bone masses showing resorption and here the adjacent granulation tissue was sometimes slightly hemorrhagic. New bone formation was extremely variable. Trabeculae were sometimes quite small and twisted in appearance with peripheral basophilia of ground substance and condensation of cells. No frankly necrotic bone could be demonstrated in these areas.

Calcium-deficient group.—In these monkeys no significant gross changes were observed. There was no microscopic evidence of gingival ulceration or hypertrophy. A variable degree of round cell infiltration was present, but was no greater than that seen in control animals. The corium of the entire gingiva was well collagenized. Collagen was present in marrow tissue in normal proportions.

Animals on combined vitamin C- and calcium-deficient diet.—These showed gross changes essentially similar to those in C-deficient group. In two animals the lesions were possibly a little less marked as to necrosis and frank hemorrhage but marked gingival hypertrophy was present even in these two.

Microscopic changes in the gingiva likewise were essentially similar to those in the C-deficient group. In two animals such changes were less marked and very little hemorrhage was present.

LESIONS IN JOINTS, LONG BONES, AND ADJACENT TISSUES

Sections of the ribs at the costochondral junction, sections of the skull, the hip, shoulder, and knee joints and longitudinal sections of the femur and humerus were studied.

Control animals.—These showed no lesions. Grossly, the bone cortex was thick and dense, the epiphyseal lines regular and of normal width, the joint cavities were smooth and there was no evidence of hemorrhage.

Vitamin C-deficient monkeys.—These showed grossly severe damage in and about the shoulder, temporomandibular, hip, knee, and elbow joints. The shoulder lesions were both the most extensive and the most frequent, being present on both sides in all four animals. It must be remembered that in caged monkeys, caught and handled at frequent intervals, the shoulder joints are the ones subjected to the most trauma and that the prominent joint lesions of scurvy appear under functional stress and trauma. Involvement of the temporomandibular joints and subperiosteal hemorrhage about the ramus of the mandible occurred in three of these animals.

Superficial examination frequently disclosed extensive subcutaneous hemorrhage overlying these joints as well as external deformity about

FIGURE 1 Vitamin C deficiency Humerus longitudinal section showing massive subperiosteal hemorrhage, destruction of epiphyseal line and impaction of head

FIGURE 2 Combined vitamin C and calcium deficiency Humerus—longitudinal section Similar to figure 1 but showing less extensive hemorrhage

FIGURE 3.—Vitamin C deficiency. Hypertrophied and everted gingiva showing hemorrhage, inflammatory infiltration, pools of fibrinoid material and epithelial islands. ×40

FIGURE 4.—Vitamin C deficiency. Humerus showing impaction of head, partial necrosis of epiphyseal line, hemorrhage, pigmentation and fibrinosis. (×11)

the damaged shoulder joints. Dissection revealed extensive hemorrhage throughout the muscle with a markedly thickened periosteum frequently discolored by blood pigment and large subperiosteal hematomas, sometimes 2 cm. in thickness, which had denuded the underlying bone, leaving, not infrequently, a very rough discolored bone surface. Usually in the badly damaged shoulder joints, the humeral epiphysis was separated and occasionally dislocated downward and inward to become embedded in hemorrhagic muscle or granulation tissue. The epiphyseal line had almost disappeared and there was gross hemorrhage into the cancellous bone. The upper end of the shaft was often markedly eroded or necrotic, and was often displaced upward to within a short distance of the overlying skin. What remained of the joint cavity was filled with bloody granulation tissue. The process sometimes extended one-half to two-thirds of the distance down the shaft of the humerus. In the less severely injured joints, the shaft was driven through the epiphyseal line into the head. The cortex of the shaft was of normal to moderately reduced thickness. Its external surface was roughened, slightly pitted, denuded of periosteum, and stained brownish yellow.

The grossly visible changes about the mandibular ramus were essentially similar while the changes about the less damaged joints varied greatly. A very slight or quite early involvement may be indicated by small hemorrhages beneath the synovial membrane and periosteum with no evidence of reaction or with only slight thickening of the overlying periosteum. In one hip joint a small hemorrhagic mass about 1 mm. in thickness was seen in an otherwise normal-appearing joint cavity.

The ribs showed a prominent nodular enlargement at the costochondral junction, measuring frequently from 5 to 8 mm. in diameter and often discolored by yellowish or brownish pigment deposits.

Calcium-deficient animals.—These show no significant gross changes in the joints. However, the bone substance of skull, long bones, and ribs was definitely softer and more fragile than normal. The skull of one animal showed a very thin translucent cortex with circinate areas of erosion on the inner surface. The bones of the two animals which were kept on the calcium deficient regime for 18 instead of 11 months were so soft that they could be cut readily with a stout knife.

Combined vitamin C- and calcium-deficient animals.—These animals showed changes which in type were essentially similar to those seen in the vitamin C-deficient group. However, the individual animal showed lesions in fewer joints and the damage in an individual joint was rarely as severe. Hemorrhage did not occur quite so frequently and when present was not usually as widespread. There was only occasionally actual destruction of bone although it was markedly softened. The costochondral junctions showed some irregular en-

largement. The most extensive involvement in these animals occurred on the external surface of the skulls where widespread subperiosteal hematomas lifted the soft tissues. On the inner surface their skulls not infrequently presented slightly raised mossy plaques of soft dark red tissue.

Two monkeys on the low vitamin C intake regime and 3 on the combined vitamin C and calcium deficiency showed slight to quite prominent exophthalamos, usually bilateral. Examination proved this to be due to subperiosteal hemorrhage within the orbits, usually in the roof but occasionally in the floor as well. The hematoma in the fixed tissue sometimes measured 4 to 6 mm. in thickness.

VISCERAL LESIONS

A moderate to marked hemosiderosis of the spleen and lymph nodes was generally noted in the vitamin C deficient animals with or without calcium deprivation. Otherwise no changes were observed in the viscera of the entire group of monkeys which could be attributed with certainty to the experimentally produced nutritional deficiencies. Staining with Sudan III showed no definite abnormality in lipoid content of liver, kidney, or adrenal. Parathyroids and thyroids showed no lesions.

All animals showed slight to marked pulmonary changes due to the presence of acarids, probably *Pneumonyssus foxi*, and many showed sarcosporidiosis of skeletal muscle.

Otherwise various incidental conditions were encountered in both control and deficient animals, usually only in one case. Among these were a parasitic abscess of the mesocolon, a multilocular renal cyst, a chronic cholecystitis with focal hepatitis, a chronic prostatitis with a nematode enclosed in the prostatic urethra, a granulomatous axillary lymphadenitis, a parasitic abdominal lymphadenitis, a multilocular liver abscess, a marked subacute pancarditis with granulomata in spleen and lymph nodes. Four of the seven female monkeys presented focal squamous metaplasia of the endocervical mucosa with more or less accompanying endocervicitis.

SUMMARY

1. Recurrent artificially induced scurvy produced in the Rhesus monkey, *Macaca mulatta*, a hemorrhagic and necrosing gingivitis, hemorrhages into the joints, beneath the periosteum, into the muscles and beneath the skin, epiphyseal separation in some of the long bones with necrosis of bone substance, and an exophthalamos caused by subperiosteal hemorrhage within the orbits.

2. A chronic calcium deficiency produced a marked osteoporosis and softening of all bones.

3. In this experiment neither scurvy, chronic calcium deficiency, nor a combination of the two produced significant visceral lesions which could be attributed to the experimental procedures employed.
4. Recurrent scurvy superimposed upon calcium deficiency produced in such animals marked softening of bone in addition to severe lesions characteristic of uncomplicated scurvy. However, the results here obtained suggest that such lesions may perhaps be somewhat less severe when calcium is withheld.

REFERENCES

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(3) Tomlinson, T. H., Jr.: Oral pathology in monkeys in various experimental dietary deficiencies. Pub. Health Rep., 54: 431–439 (March 17, 1939).

AN EPIDEMIC OF ACUTE RESPIRATORY INFECTION OF UNUSUAL TYPE [1]

By J. W. OLIPHANT, *Passed Assistant Surgeon*, and T. R. DAWBER, *Passed Assistant Surgeon, United States Public Health Service*

During April and May 1942, more than 200 cases of a peculiar type of acute febrile respiratory illness occurred among the personnel of the Coast Guard Training Station at Manhattan Beach, Long Island, N. Y. About 170 cases were hospitalized in the United States Marine Hospitals at Staten Island, N. Y. and at Ellis Island, N. Y., between April 30 and May 18. There were no deaths.

EPIDEMIOLOGY

It was impossible to form any conclusion about the mode of spread because of conditions in the station where the epidemic occurred. Opportunities for close contact of the men were numerous. The barracks in use were small and crowded. Contact was frequent at work and at meals. The personnel was fluctuating during the course of the epidemic, with men being transferred away from the station and new men arriving constantly.

Possibly the best information as to the incubation period was furnished by a secondary epidemic at another small Coast Guard station at Southampton, Long Island. On April 23, three men were transferred from Manhattan Beach to Southampton. One of these, C., had had a bronchitis for about 4 weeks previously and was coughing when he arrived at Southampton. He was seen by the medical officer on April 24 and was put to bed for several days. Five or six days after

[1] From the Division of Infectious Diseases, National Institute of Health, and the Hospital Division.

his arrival at Southampton, he noticed streaks of blood in his sputum on two or three occasions.

A report from the medical officer of the Southampton station on May 22, 1942 stated there were 27 men at the station, of whom 10 were radiomen who did not sleep or eat at the station. These 10 remained well. Of the 17 men who ate and slept on the station, all except one developed, 11 or more days after the arrival of C., illness characterized by fever, general malaise, cough, sore throat, and pharyngitis. One man besides C. had bloody sputum during illness.

C. stated that he went home on leave on May 6 and stayed until May 8. After his return to duty he learned that his sweetheart had become ill with sore throat on May 11 and had been confined to her bed for several days. She had no cough.

SYMPTOMATOLOGY AND CLINICAL COURSE

There was often a history of a "cold" for 1 week or longer, with slight nasal discharge, tired feeling, sweating, and slight malaise. This was followed by the onset of a sore throat and cough with slight expectoration along with a feeling of chilliness or frank chill followed by a feeling of feverishness. The throat became quite sore, the cough rapidly increased in severity and productiveness, with mucoid sputum. Symptoms became maximal in about 2 days. At that time there was a severe sore throat; cough was marked and hacking in character. There was soreness "deep in the chest" in the retrosternal area. The soreness was most prominent in those with severe cough. Sputum was frequently blood-tinged and in some was frankly bloody. Hoarseness was almost universal and varied from mild to so severe as to produce aphonia. The temperature at the peak of the disease was about 40° C. In spite of the high fever there was relatively little prostration.

Physical examination showed a febrile patient. The skin was hot and dry. There was frequently injection of the conjunctivae. In many patients a moderate nasal discharge, sometimes blood-streaked, was noted. Examination of the throat showed a fiery red pharynx with hypertrophy and edema of the pharyngeal lymphoid tissue. Occasionally a bleeding point could be seen on the posterior pharyngeal wall. The injection extended over the tonsillar pillars and involved the tonsils when present. Some exudate could be seen on the tonsils. The injection usually extended over the soft palate. The remainder of the mouth was usually normal. Adenopathy of the anterior cervical chain was common with slight tenderness on palpation. Examination of the chest failed to disclose any evidence of disease except an occasional sibilant rale. X-rays of the lungs were almost uniformly negative. Two patients each had a small area of questionable bronchopneumonia. The pulse was usually 80 to 90 even in the presence

of high fever. The remainder of the physical examination was essentially negative. No splenomegaly, generalized adenopathy, or skin rash was noted. Under symptomatic treatment recovery was usually rapid. After hospitalization the temperature often dropped to normal in 24 to 72 hours, cough decreased, and the pharyngitis declined in severity. Frequently the cough persisted for 7 to 8 days and the bloody sputum could be noted several days after the subsidence of fever. The pharyngeal injection usually persisted for about one week. The patient was left with a feeling of slight fatigue but otherwise had no untoward symptoms after recovery.

LABORATORY FINDINGS

The total white blood cell counts were either normal or were moderately elevated.

Cultures[2] of the sputum revealed a variety of organisms. Among these were *Hemophilus influenzae*, various types of pneumococci, and occasional β hemolytic streptococci, none of which were of Group A (Lancefield).

Attempts at isolation of influenza viruses have so far been unsuccessful. Serological tests against influenza A and B viruses have so far shown no evidence of the development of serum antibodies against either agent.[3]

A tabulation of the principal findings was made from the hospital charts of 101 patients in the United States Marine Hospitals at Stapleton and Staten Island, N. Y. These are shown in order of frequency, in table 1.

TABLE 1.—*Principal findings in 101 cases of acute respiratory infection at the United States Marine hospitals, Stapleton and Staten Island, N. Y.*

Finding:	*Number cases*
Cough	98
Pharyngitis	92
Sore throat	73
Conjunctivitis	42
Chill	40
Aching of body and/or extremities	27
Hoarseness	22
Blood in sputum	20

Such a tabulation would naturally reveal many omissions. For instance several patients probably had mild soreness of the throat and did not complain of it specifically. Many of these patients did not enter the hospital until 2 to 4 days after onset and for that reason some of their symptoms had subsided before examination.

To arrive at an estimate of the total duration of fever, the interval

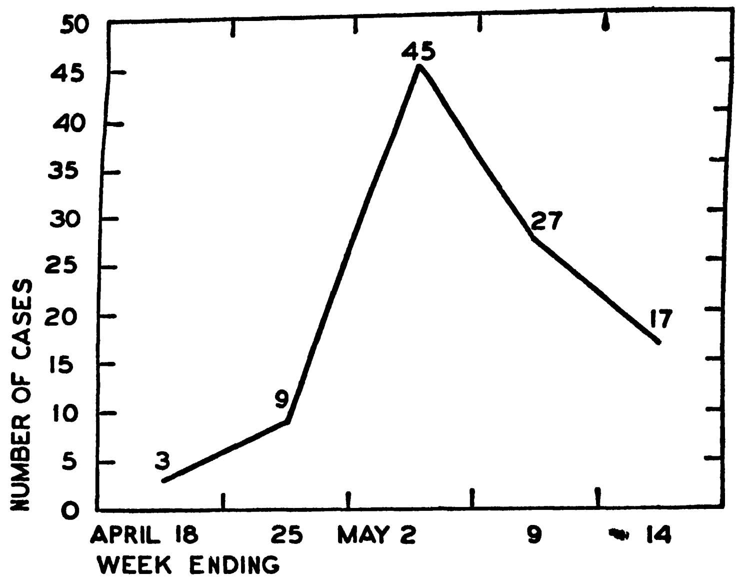
[2] Cultural studies were done by Passed Assistant Surgeon R. G. Pasternack of the U. S. Marine Hospital, Stapleton, New York, and by members of the staff of the hospital of the Rockefeller Institute, New York, N. Y.

[3] Influenza virus studies were done by Dr. F. L. Horsfall, Jr., and his associates at the Hospital of the Rockefeller Institute, New York, N. Y.

of time elapsing between the day of onset reported by the patient and the day of defervescence in the hospital was calculated in 96 of

CHART I

101 CASES GROUPED BY WEEKS ACCORDING TO HISTORY OF ONSET



the same cases (the history was uncertain as to onset in 6 others). These are shown in table 2.

TABLE 2.—*Estimate of total duration of fever in 96 cases of acute respiratory infection*

Number of days from onset to defervescence	Number cases	Number of days from onset to defervescence	Number cases
2	2	12	3
3	5	14	1
4	5	15	3
5	18	16	1
6	15	17	1
7	17	18	1
8	10	19	1
9	11		
10	2	Total ...	96

Median—7 days. Mean—7.36 days.

Treatment was for the most part symptomatic, including the use of codeine, sedative cough mixtures, and steam inhalations. A few patients were treated with sulfathiazole. There was no evidence that this compound exerted any beneficial effect.

COMPLICATIONS

With the exception of two patients who had small questionable areas of bronchopneumonia, there were no complications, which seemed surprising in view of the intense inflammatory reaction in the throat and trachea.

SUMMARY

More than 200 cases of an acute febrile respiratory illness occurred during April and May in a Coast Guard training station. The disease was characterized by fever of about 7 days' duration, cough, pharyngitis, laryngitis, tracheitis, malaise, and aching of the body and extremities. Bloody sputum was present in a considerable number of cases.

No constantly-occurring organism was found in bacterial cultures. No relation to known types of influenza virus has been established.

CURRENT NEEDS FOR HEALTH PERSONNEL

By G. St. J. Perrott, *Chief, Division of Public Health Methods*, and Harold F. Dorn, *Senior Economist, United States Public Health Service*[1]

With the expansion of the armed forces following the passage of the Selective Service Act and with the increased demand for workers resulting from the expansion of war industries, both public and private health agencies began to report increasing difficulty in obtaining personnel, not only to fill current vacancies but also to meet demands for new services arising from the shift of population to centers of war industry. As a result of the increasing number of such reports, the United States Public Health Service initiated a survey to ascertain the extent and magnitude of the reported shortage of personnel.

In December 1941, with the cooperation of the American Hospital Association, a questionnaire requesting information concerning the number of vacancies and the probable need for new personnel in the immediate future was sent to each registered hospital in the United States. The same questionnaire was also sent to more than 300 clinics.

In January 1942, in cooperation with the Procurement and Assignment Service of the Office of Defense Health and Welfare Services, a similar questionnaire was sent to each full-time State, city, and county health department, and to a number of voluntary health agencies. The reports of 1,036, or 80 percent, of the 1,272 health departments to which questionnaires were sent are summarized in table 1.

[1] From the Division of Public Health Methods, National Institute of Health.

TABLE 1.—*Present personnel and estimated number of persons needed by 1,036 health departments that returned questionnaires* [1]

Type of personnel	Number of present personnel	Number of vacant positions	Estimated number of new persons needed
Administrative medical officers	1,183	69	101
Other medical officers	902	115	259
Dentists	281	24	153
Veterinarians	105	9	15
Public health nurses	7,946	504	1,777
Sanitary engineers	885	106	273
Other sanitation personnel	2,920	99	747
Bacteriologists and chemists	909	43	93
Other laboratory technicians	903	53	151
Statisticians	264	17	70
Nutritionists	81	12	109
Medical social workers	201	26	116
Dental hygienists	120	7	6
X-ray technicians	42		1
Others	179	9	37
Total	16,921	1,093	3,908

[1] Includes Puerto Rico.

THE NEED FOR PUBLIC HEALTH PERSONNEL

These health departments now employ 16,921 technically trained full-time paid persons, have existing vacancies for 1,093 persons, and need an additional 3,908 persons to provide services made necessary by wartime activities. If it is assumed that the remaining 20 percent of the health departments need proportionately as many persons, the estimated total number of trained personnel needed at the present time is slightly more than 6,000, or an increase of about 30 percent (table 2). Nearly one-half (46 percent) of the personnel needed are public health nurses, about one-tenth (9 percent) are physicians, and one-quarter are sanitary engineers and other sanitation personnel.

TABLE 2.—*Estimated number of persons needed by all State and local health departments*

Type of personnel	Total	To fill vacant positions	New persons
Administrative medical officers	110	83	127
Other medical officers	469	144	325
Dentists	222	30	192
Veterinarians	32	11	21
Public health nurses	2,862	633	2,229
Sanitary engineers	476	133	343
Other sanitation personnel	1,061	124	937
Bacteriologists and chemists	171	54	117
Other laboratory technicians	255	66	189
Statisticians	110	22	88
Nutritionists	152	15	137
Medical social workers	178	32	146
Dental hygienists	17	9	8
X-ray technicians	1		1
Others	57	11	46
Total	6,273	1,367	4,906

The effect upon the efficiency of a health department of the loss of even one or two key persons cannot be adequately measured by the

number of vacancies alone. The loss of a county health officer means that the entire work of the department is seriously impaired; the loss of the chief sanitary engineer in a State department means that the work must be reorganized if the vacancy cannot be filled. Health departments operate with a relatively small staff of professionally and technically trained persons. The loss of a few such persons may bring many phases of the program to a virtual standstill.

THE NEED FOR HOSPITAL PERSONNEL

Private and non-Federal governmental hospitals at the present time need nearly 20,000 nonmedical professional and technical persons to fill current vacancies and have under way, or are planning, additions to present facilities which will require an additional 20,000 trained persons (table 3.) This estimate is based upon the reports of 3,181 private and non-Federal governmental hospitals which represent 53 percent of the registered private and non-Federal governmental hospitals and have 57 percent of the total number of beds in such hospitals.

TABLE 3.—*Estimated number of professional and technical persons needed by private and non-Federal governmental hospitals*

Type of personnel	Total	Number of persons needed	
		To fill vacant positions for which funds are available	To fill positions which will be created by expansion of present facilities
Graduate nurses	17,722	9,684	8,038
Student nurses	8,129	3,273	4,856
Other persons giving nursing care	10,116	4,610	5,506
Nurse-anesthetists	479	246	233
Dietitians	550	204	346
X-ray technicians	422	178	244
Other laboratory technicians	691	297	394
Dental hygienists	59	33	26
Occupational therapists	247	110	137
Physical therapy technicians	292	103	189
Medical social workers	267	90	177
Medical record librarians	311	105	206
Total	39,285	18,933	20,352

The reports of these 3,181 hospitals are summarized in table 4. The estimates in table 3 are based upon the assumption that the personnel and needs of the hospitals which failed to report are the same in relation to the number of beds as the personnel and needs of the hospitals which did report.

Many hospitals report that the difficulty of obtaining internes, residents, and service and maintenance personnel is fully as great as the difficulty of obtaining technically trained persons. This shortage of personnel is partially the result of an increased demand for

hospital service arising from the higher income of wage workers and, in certain areas, from a rapid increase in population because of the expansion of war industries. Equally important, however, is the loss of personnel, some of whom have been taken by the armed forces or governmental and military agencies needing trained persons, while others have left because higher wages and shorter hours could be obtained from employment in various war industries.

TABLE 4.—*Number of different types of professional and technical persons needed by 3,181 private and non-Federal governmental hospitals*

Type of personnel	Present number employees	Additional number needed			Percentage total needs are of present personnel	Percentage distribution of total needs by type
		Total	To fill vacant positions for which funds are available	To fill positions which will be created by expansion of present facilities		
Graduate nurses	66,181	10,427	5,665	4,762	15 8	45.2
Student nurses	52,420	4,849	1,949	2,900	9.3	21.0
Other persons giving nursing care	55,828	5,868	2,657	3,211	10 5	25.4
Nurse-anesthetists	2,181	285	146	139	13 1	1.2
Dietitians	3,155	324	120	204	10.3	1.4
X-ray technicians	3,299	249	104	145	7.5	1.1
Other laboratory technicians	4,706	408	174	234	8.7	1.8
Dental hygienists	300	34	19	15	11 3	.1
Occupational therapists	959	140	62	78	14.6	.6
Physical therapy technicians	1,302	170	60	110	13 1	.7
Medical social workers	1,377	153	51	102	11 1	.7
Medical record librarians	1,904	185	63	122	9 7	.8
Total	193,612	23,092	11,070	12,022	11.9	100.0

As might be expected, persons giving nursing care are in greatest demand. Forty-five percent of the total number of persons needed are graduate nurses, 21 percent are student nurses, while 25 percent are orderlies, practical nurses, trained attendants, and other persons giving nursing care. The remaining 9 percent of the persons needed are fairly evenly distributed among the other types of technical jobs.

It is anticipated that the needs for personnel shown in the above tables will increase as the armed forces expand, and as more and more persons are required for the expansion of war industries. With the exception of physicians, dentists, and nurses, the armed forces are now training an appreciable proportion of their own requirements for technical health personnel. However, men of military age will continue to be taken for military service unless present policies are changed.

Moreover, within the immediate future, the increasing demand for workers in war industries will attract many persons now employed by health agencies. The losses for this reason will probably be greatest among service and maintenance workers but there is no reason to believe that it will be confined solely to them.

DEATHS DURING WEEK ENDED JUNE 20, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended June 20, 1942	Corresponding week, 1941
Data from 86 large cities of the United States:		
Total deaths	7,629	7,695
Average for 3 prior years	7,536	
Total deaths, first 24 weeks of year	207,621	210,298
Deaths per 1,000 population, first 24 weeks of year, annual rate	12.2	12.4
Deaths under 1 year of age	546	502
Average for 3 prior years	493	
Deaths under 1 year of age, first 24 weeks of year	13,305	12,289
Data from industrial insurance companies:		
Policies in force	64,971,781	64,428,322
Number of death claims	10,518	10,814
Death claims per 1,000 policies in force, annual rate	8.4	8.8
Death claims per 1,000 policies, first 24 weeks of year, annual rate	9.8	10.2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JUNE 27, 1942

Summary

A sharp increase in the number of cases of meningococcus meningitis occurred during the week, with 112 cases reported, as compared with 64 for the preceding week and a 5-year (1937–41) median of 36 cases. The incidence for the current week is above that for the corresponding week of any year since 1929, and the total to date (1,967) is above that for any year since 1937, when 3,648 cases had been reported for the corresponding period. The most significant increases during the current week occurred in California (from 3 to 29), Massachusetts (from 2 to 12), New York (from 11 to 17), and Maryland (from 7 to 10). With the exception of California, the highest incidence continues in the tier of eastern States.

Although the number of cases of poliomyelitis increased from 38 to 41, the current incidence is below that for the corresponding week of any other year since 1938, and the cumulative total to date is also below that for the corresponding period of any other year since 1938.

The incidence of smallpox (12 cases) continues well below the corresponding figure for any prior year.

Reports of other diseases during the current week include 2 cases of anthrax (New Jersey and Louisiana, 1 each), 24 cases of amebic, 378 bacillary (315 in Texas), and 203 cases (163 in Virginia) of unspecified dysentery, 21 cases of Rocky Mountain spotted fever (14 in the eastern States), 27 cases of tularemia, and 58 cases of endemic typhus fever (25 in Texas and 21 in Georgia).

The death rate for the current week for 88 large cities in the United States is 10.8 per 1,000 population, the same as for the preceding week. This is slightly below the 3-year (1939–41) average for the week of 10.9.

Telegraphic morbidity reports from State health officers for the week ended June 27, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria: Week ended— June 27, 1942	Diphtheria: Week ended— June 28, 1941	Diphtheria: Median 1937–41	Influenza: Week ended— June 27, 1942	Influenza: Week ended— June 28, 1941	Influenza: Median 1937–41	Measles: Week ended— June 27, 1942	Measles: Week ended— June 28, 1941	Measles: Median 1937–41	Meningitis, meningococcus: Week ended— June 27, 1942	Meningitis, meningococcus: Week ended— June 28, 1941	Meningitis, meningococcus: Median 1937–41
NEW ENG.												
Maine	0	0	0	----	----	----	48	82	82	1	0	0
New Hampshire	0	0	0	----	----	----	5	2	9	0	0	0
Vermont	0	0	0	----	----	----	131	80	80	0	0	0
Massachusetts	2	5	1	----	----	----	676	826	711	12	4	1
Rhode Island	1	1	1	----	----	----	113	17	43	1	0	0
Connecticut	1	0	1	1	----	----	227	317	69	2	1	0
MID. ATL.												
New York	9	13	19	[1] 2	[1] 1	[1] 2	996	1,361	1,146	17	4	4
New Jersey	3	3	8	3	3	3	369	784	700	3	3	1
Pennsylvania	6	12	14	1	----	----	325	1,850	778	6	1	1
E. NO. CEN.												
Ohio	2	6	6	18	4	8	182	749	419	0	0	1
Indiana	2	5	5	----	6	3	63	114	80	1	0	1
Illinois	17	15	16	18	11	11	130	428	422	1	0	1
Michigan [3]	1	5	8	1			208	692	692	0	1	1
Wisconsin	0	1	1	12	7	13	892	1,049	793	1	0	1
W. NO. CEN.												
Minnesota	1	2	2	----	----	1	121	14	61	1	0	0
Iowa	1	1	1	----	6	2	193	92	84	0	0	0
Missouri	0	1	6		----	----	65	239	26	0	0	0
North Dakota	0	1	1	4	----	2	11	20	10	0	0	0
South Dakota	0	3	0		----	----	7	6	3	0	0	0
Nebraska	2	5	1	2	----	----	56	13	13	0	0	0
Kansas	1	5	5	1	----	1	68	128	122	0	0	1
SO. ATL.												
Delaware	0	0	0	----	----	----	1	14	3	0	0	0
Maryland [3]	3	3	3	----	----	1	71	360	81	10	5	2
Dist. of Col.	2	1	1	-	1		42	80	43	2	0	1
Virginia	2	10	6	40	44	11	72	526	167	8	4	3
West Virginia	2	4	4	3	4	5	23	181	43	1	1	1
North Carolina	3	5	9		1		120	525	378	1	1	2
South Carolina	1	7	5	81	64	64	29	279	48	1	0	0
Georgia	4	3	3	14	4		42	228	42	0	0	0
Florida	3	2	4	7	8	1	76	49	22	0	0	0
E. SO. CEN.												
Kentucky	4	1	3	-	2	4	13	96	77	1	1	3
Tennessee	4	4	3	18	18	10	16	150	48	0	1	1
Alabama	0	9	6	12	1	3	21	94	62	2	2	2
Mississippi [3]	1	3	3	----	----	----	----	----	----	2	0	0
W. SO. CEN.												
Arkansas	2	2	2	8	2	4	23	114	17	1	0	0
Louisiana	7	1	8	5		9	54	2	5	1	0	0
Oklahoma	2	2	2	7	9	9	25	63	46	1	0	1
Texas	23	18	18	76	264	89	144	196	196	1	1	0
MOUNTAIN												
Montana	2	0	0	----	----	-	74	6	31	0	1	0
Idaho	0	0	0	----	4	1	38	23	20	0	0	0
Wyoming	0	0	1	42	--	----	18	5	5	0	0	0
Colorado	5	9	9	27	11	----	75	92	69	0	1	0
New Mexico	0	3	3	1	--	--	11	52	31	0	0	0
Arizona	0	0	1	14	40	30	34	90	12	0	0	0
Utah [2]	0	0	0	1	----	----	473	17	81	1	0	0
Nevada	0	0	----	----	----	----	19	1	----	0	0	----
PACIFIC												
Washington	0	4	1	1	----	----	247	52	61	1	1	1
Oregon	0	4	4	3	6	6	80	34	34	3	1	0
California	8	7	22	28	356	20	1,968	285	285	29	2	2
Total	127	186	207	451	877	437	8,695	12,477	8,288	112	36	36
25 weeks	6,178	6,279	9,980	77,756	484,774	157,042	444,331	793,623	329,389	1,967	1,180	1,180

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended June 27, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41
	June 27, 1942	June 28, 1941		June 27, 1942	June 28, 1941		June 27, 1942	June 28, 1941		June 27, 1942	June 28, 1941	
NEW ENG												
Maine	0	0	0	8	2	6	0	0	0	0	1	1
New Hampshire	0	0	0	1	0	5	0	0	0	0	0	0
Vermont	0	0	0	2	4	3	0	0	0	0	0	0
Massachusetts	0	0	0	135	147	147	0	0	0	3	1	1
Rhode Island	0	0	0	5	7	7	0	0	0	0	0	0
Connecticut	0	0	0	12	23	38	0	0	0	1	0	1
MID ATL												
New York	3	4	1	167	218	219	0	0	0	13	11	10
New Jersey	0	0	0	55	82	70	0	0	0	4	3	3
Pennsylvania	0	1	0	113	138	138	0	0	0	4	8	8
E NO CEN												
Ohio	0	0	1	101	75	75	1	0	0	6	8	8
Indiana	0	0	0	15	22	28	0	0	6	4	5	5
Illinois	3	0	1	87	129	174	0	3	5	2	15	7
Michigan [2]	2	0	0	99	126	208	0	1	1	0	2	2
Wisconsin	0	0	0	62	53	73	1	2	2	0	0	1
W NO CEN												
Minnesota	1	1	1	20	29	29	0	0	7	0	0	0
Iowa	0	0	0	14	15	22	1	0	8	0	0	2
Missouri	1	0	0	13	37	25	0	0	3	1	5	5
North Dakota	0	0	0	6	0	6	0	0	0	0	0	0
South Dakota	0	0	0	13	4	4	1	15	1	0	0	0
Nebraska	0	0	0	6	8	8	0	1	1	0	0	0
Kansas	1	0	0	15	14	25	0	0	1	1	3	3
SO ATL												
Delaware	0	0	0	9	2	2	0	0	0	2	0	0
Maryland [2]	1	0	0	22	12	12	0	0	0	2	0	1
Dist of Col	0	0	0	8	3	9	0	0	0	1	0	0
Virginia	0	2	2	7	12	11	0	0	0	7	3	5
West Virginia	0	0	0	13	13	14	0	0	1	4	2	3
North Carolina	1	1	1	5	16	13	0	0	0	10	2	7
South Carolina	0	2	1	0	2	2	0	0	0	0	3	11
Georgia	0	23	3	6	8	8	0	1	0	11	18	30
Florida	1	10	1	1	3	3	0	0	0	3	1	1
E SO CEN												
Kentucky	0	0	0	17	19	19	3	0	0	7	9	11
Tennessee	2	1	1	6	19	14	0	0	1	6	11	13
Alabama	2	10	5	3	4	4	0	0	0	2	3	8
Mississippi [2]	4	5	4	3	2	2	0	0	0	4	9	9
W SO CEN												
Arkansas	3	0	0	2	1	6	1	0	1	6	12	12
Louisiana	7	3	2	4	5	5	0	0	0	6	24	22
Oklahoma	0	1	1	1	10	10	0	0	3	8	12	10
Texas	1	4	3	25	25	25	0	1	1	21	48	26
MOUNTAIN												
Montana	0	1	0	9	6	6	0	0	1	0	2	2
Idaho	0	0	0	4	4	2	0	0	0	1	1	1
Wyoming	0	1	0	1	4	2	0	0	1	0	0	0
Colorado	1	1	0	0	15	15	2	0	1	4	3	3
New Mexico	0	1	0	4	2	7	0	0	0	3	4	2
Arizona	3	0	0	1	4	3	0	0	0	1	0	1
Utah [2]	1	0	0	7	5	5	0	0	0	2	0	1
Nevada	0	0	------	0	0	------	1	1	------	0	0	------
PACIFIC												
Washington	1	0	0	5	10	18	0	0	0	2	3	1
Oregon	0	0	0	7	8	8	0	5	5	0	2	2
California	2	7	9	78	68	100	1	0	7	3	6	5
Total	41	79	79	1,197	1,415	1,578	12	30	92	155	240	265
25 weeks	555	671	671	83,281	84,141	109,521	554	1,074	7,219	2,212	2,422	3,370

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended June 27, 1942—Continued

Division and State	Whooping cough		Week ended June 27, 1942								
	Week ended—		Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt spotted fever	Tularemia	Typhus fever
	June 27, 1942	June 28, 1941		Amebic	Bacillary	Unspecified					
NEW ENG											
Maine	25	15	0	0	0	0	0	0	0	0	0
New Hampshire	2	0	0	0	0	0	0	0	0	0	0
Vermont	90	8	0	0	0	0	0	0	0	0	0
Massachusetts	186	191	0	0	0	0	1	0	0	0	0
Rhode Island	16	13	0	0	0	0	0	0	0	0	0
Connecticut	95	47	0	0	0	0	0	0	0	0	0
MID ATL											
New York	436	270	0	1	3	0	1	0	0	1	3
New Jersey	325	118	1	1	0	0	0	0	0	0	0
Pennsylvania	206	307	0	0	0	0	0	0	0	0	0
E NO CEN											
Ohio	173	236	0	0	0	0	0	0	0	0	0
Indiana	43	16	0	0	0	0	0	0	0	0	0
Illinois	271	117	0	1	0	0	1	0	2	2	0
Michigan [2]	178	282	0	0	0	0	0	0	0	0	0
Wisconsin	169	129	0	0	0	0	0	0	0	0	0
W NO CEN											
Minnesota	39	79	0	5	0	0	0	0	0	0	0
Iowa	28	32	0	0	0	0	0	0	0	0	0
Missouri	4	67	0	0	0	1	0	0	0	2	0
North Dakota	17	20	0	0	0	0	1	0	0	0	0
South Dakota	2	11	0	0	0	0	0	0	0	0	0
Nebraska	6	18	0	0	0	0	0	0	0	0	0
Kansas	46	152	0	0	0	0	2	0	0	0	0
SO ATL											
Delaware	2	5	0	0	0	0	0	0	0	0	0
Maryland [2]	55	79	0	0	0	3	0	0	3	0	0
Dist of Col	28	9	0	0	0	0	0	0	0	0	0
Virginia	51	102	0	0	0	164	0	0	3	0	1
West Virginia	23	57	0	0	0	0	0	0	0	0	0
North Carolina	128	330	0	0	0	0	0	0	1	0	1
South Carolina	40	160	0	0	2	0	0	0	0	0	1
Georgia	49	17	0	1	10	0	0	0	0	1	21
Florida	13	11	0	0	0	0	0	0	0	0	2
E SO CEN											
Kentucky	41	69	0	0	6	0	0	0	0	0	0
Tennessee	8	71	0	0	0	17	1	0	1	0	1
Alabama	29	23	0	0	0	0	0	0	0	0	2
Mississippi [2]			0	0	0	0	0	0	0	1	1
W SO CEN											
Arkansas	17	13	0	6	5	0	0	0	0	10	0
Louisiana	14	14	1	3	26	0	0	0	0	0	0
Oklahoma	16	50	0	0	0	0	0	0	0	0	0
Texas	248	274	0	8	315	0	1	0	4	1	25
MOUNTAIN											
Montana	15	27	0	0	0	0	0	0	2	1	0
Idaho	7	14	0	0	0	0	0	0	1	0	0
Wyoming	3	5	0	0	0	0	0	0	1	4	0
Colorado	30	204	0	0	0	0	0	0	1	0	0
New Mexico	26	36	0	0	0	0	0	0	0	0	0
Arizona	12	12	0	0	0	18	0	0	0	0	0
Utah [2]	31	70	0	0	0	0	0	0	1	1	0
Nevada	0	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	16	134	0	0	0	0	0	0	1	0	0
Oregon	30	23	0	0	0	0	0	0	0	0	0
California	191	558	0	3	11	0	1	1	0	3	0
Total	3,475	4,495	2	24	378	203	9	1	21	27	58
25 weeks	95 277	116,429									

[1] New York City only

[2] Period ended earlier than Saturday

PLAGUE INFECTION IN CALIFORNIA, IDAHO, AND OREGON

The following reports of plague infection found in California, Idaho, and Oregon since May 1, 1942, have recently been received: [1]

CALIFORNIA

Kern County: May 4, in a pool of 5 fleas from 4 chipmunks, *Eutamias*, from a ranch 2 miles south of Davis Ranger Station.

Lassen County: May 21, in tissue from a marmot, *M. flaviventris nosophora* (?), taken 19 miles southeast of Adin; May 31, in tissue from 1 ground squirrel, *C. beldingi oregonus*, taken 9 miles east of Amedee.

Monterey County: May 5, in tissue from a pack rat, *Neotoma fuscipes*, taken in Lugo Canyon, west of San Antonio river; May 20, in tissue from 5 wood rats, taken on Highway in San Lucas Canyon, 8 miles northeast of Lockwood; June 2, in tissue from a ground squirrel, *C. beecheyi*, taken in Lugo Canyon, upper end, near Nacimento Road.

San Luis Obispo County: May 27, in tissue from a jack rabbit, *Lepus californicus*, taken at Ace Oakley, 16 miles southeast of Arroyo Grande (Alamo Creek); in a pool of organs from 9 ground squirrels, *C. beecheyi*, taken in Alamo Creek area, northeast of Santa Maria; and May 28, in tissue from 1 brush rabbit, and from 1 ground squirrel, *C. beecheyi*, taken in same locality.

Santa Barbara County: June 1, in tissue from carcasses of 2 ground squirrels, *C. beecheyi*, taken 8 to 9 miles northeast of Santa Maria; June 4, in tissue from 1 ground squirrel (8 weeks old), same species, taken 12 to 13 miles northeast of Santa Maria.

Siskiyou County: May 28, in a pool of 152 fleas from 8 ground squirrels, *C. douglasii*, taken 1½ miles west of Montague.

IDAHO

Ada County: May 6, in a pool of 90 fleas from 3 marmots, *M. flaviventris*, taken south of Boise; May 7, in tissue from 2 sick ground squirrels *C. townsendii mollis*, taken 1½ miles southeast of Gowen Field Air Base at Boise (infection later found in fleas and lice from these squirrels; an epizotic of plague occurred in this locality last spring); in a pool of 50 fleas from ground squirrels; and, May 8, in tissue from 1 ground squirrel and a pool of 70 fleas from 44 ground squirrels all of the same species and from the same locality.

Canyon County: May 13, in a pool of 30 fleas from ground squirrels, *C. townsendii mollis*, taken 3 to 6 miles north of junction of highways U. S. #30 and State #44; May 18, in tissue from 1 ground squirrel, *C. townsendii mollis*, taken 6 miles north of same junction.

[1] For reports of plague infection found up to May 1, 1942, see PUBLIC HEALTH REPORTS, June 26, 1942, page 979.

OREGON

Grant County: May 24, in a pool of 19 fleas, 16 lice, and 6 ticks from 83 ground squirrels, *C. oregonus;* May 25, in tissue from 1 ground squirrel, same species, all from a ranch 4 miles southwest of Mt. Vernon.

Harney County: May 14, in a pool of 14 fleas from 1 marmot, *M. flaviventris avara*, taken 2 to 4 miles southwest of Follyfarm.

Lake County: May 8, in a pool of 400 fleas from marmots, *M. flaviventris flaviventris*, taken at Lake Albert, 5 to 7 miles north of Valley Falls, highway #395.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 13, 1942

This table lists the reports from 90 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	2	0	0	0	0	0	1	0	0	1
Baltimore, Md	3	0	1	0	102	8	7	0	22	0	3	25
Barre, Vt	0	0	---	0	4	0	0	0	0	0	0	2
Billings, Mont	0	0	---	0	21	0	0	0	1	0	0	1
Birmingham, Ala	1	0	1	0	4	0	2	0	2	0	0	6
Boise, Idaho	0	0	---	0	4	0	0	0	0	0	0	0
Boston, Mass	3	0	---	0	239	1	7	0	47	0	2	47
Bridgeport, Conn	0	0	---	0	7	0	2	0	3	0	0	1
Brunswick, Ga	0	0	---	0	2	0	1	0	0	0	0	0
Buffalo, N. Y	0	0	---	0	22	0	5	0	16	0	0	4
Camden, N. J	0	0	---	0	0	0	4	0	11	0	0	1
Charleston, S. C	0	0	2	0	4	0	1	0	0	0	0	0
Charleston, W Va	0	0	---	0	0	0	0	0	0	0	0	0
Chicago, Ill	17	0	1	1	38	0	13	0	27	0	0	151
Cincinnati, Ohio	1	0		0	4	0	4	0	7	0	0	10
Cleveland, Ohio	1	0	1	0	8	1	3	0	36	0	0	36
Columbus, Ohio	0	0	---	0	39	0	6	0	4	0	0	18
Concord, N H	0	0	---	0	1	0	0	0	0	0	0	0
Cumberland, Md	0	0	---	0	0	0	0	0	0	0	0	0
Dallas, Texas	5	0	---	0	3	0	1	0	2	0	5	14
Denver, Colo	2	0	1	0	99	1	5	0	2	0	0	12
Detroit, Mich	5	0	---	0	40	0	6	0	95	0	0	97
Duluth, Minn	0	0	---	0	1	0	1	0	4	0	0	3
Fall River, Mass	3	0	---	0	14	0	1	0	16	0	1	1
Fargo, N Dak	0	0	---	0	3	0	1	0	1	0	0	0
Flint, Mich	0	0	---	0	1	0	6	0	1	0	0	1
Fort Wayne, Ind	0	0	---	0	1	0	1	0	0	0	0	0
Frederick, Md	0	0	---	0	0	0	0	0	0	0	0	0
Galveston, Texas	0	0	---	0	7	0	0	0	0	0	0	11
Grand Rapids, Mich	0	0	---	0	1	0	0	0	1	0	0	7
Great Falls, Mont	0	0	---	0	15	0	0	0	1	0	0	1
Hartford, Conn	0	0	---	0	60	0	0	0	2	0	0	15
Helena, Mont	0	0	---	0	18	0	0	0	0	0	0	2
Houston, Texas	0	0	---	0	3	0	3	0	0	0	0	1
Indianapolis, Ind	0	0	---	0	46	0	0	0	9	0	0	23
Kansas City, Mo	0	0	---	0	78	0	1	0	11	0	0	1
Kenosha, Wis	0	0	---	0	3	0	0	0	2	0	0	11
Little Rock, Ark	0	0	---	0	0	0	2	0	0	0	0	0
Los Angeles, Calif	3	0	8	2	382	0	13	0	23	0	0	25
Lynchburg, Va	0	0	---	0	1	0	0	0	0	0	0	20
Memphis, Tenn	0	0	---	0	18	0	6	0	3	0	0	15
Milwaukee, Wis	0	0	1	1	402	0	1	0	31	0	0	33
Minneapolis, Minn	1	0	---	0	56	0	3	0	3	0	0	3
Missoula, Mont	0	0	---	0	1	0	1	0	0	0	0	0
Mobile, Ala	0	0	1	0	0	0	3	0	0	0	0	0
Nashville, Tenn	0	0	---	0	6	0	0	0	2	0	0	2
Newark, N. J	0	0	---	0	208	1	1	0	12	0	0	55
New Haven, Conn	0	0	---	0	33	0	0	0	1	0	0	16
New Orleans, La	0	0	---	0	30	1	2	0	1	0	1	6
New York, N Y	8	1	3	0	80	12	29	1	123	0	4	158
Omaha, Nebr	0	0	---	0	6	0	3	0	0	0	0	0
Philadelphia, Pa	3	0	---	2	26	3	14	0	94	0	3	96
Pittsburgh, Pa	3	0	---	1	14	1	2	0	11	0	1	24
Portland, Maine	0	0	---	0	48	2	2	0	1	0	0	11
Providence, R I	0	0	---	0	100	0	0	0	2	0	1	30

City reports for week ended June 13, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Pueblo, Colo	0	0	------	0	1	0	0	0	0	0	0	0
Racine, Wis	0	0	------	0	119	0	0	0	9	0	0	19
Raleigh, N. C	0	0	------	0	6	0	1	0	0	0	0	1
Reading, Pa	0	0	------	0	2	0	0	0	0	0	1	5
Richmond, Va	0	0	1	0	13	0	3	0	2	0	0	1
Roanoke, Va	0	0	------	0	1	0	0	0	0	0	0	0
Rochester, N. Y	0	0	------	0	19	0	1	0	8	0	0	10
Sacramento, Calif	2	0	------	0	28	0	0	0	0	0	0	36
Saint Joseph, Mo	0	0	------	0	0	0	0	0	0	0	0	0
Saint Louis, Mo	0	0	------	0	19	0	10	0	6	0	0	2
Saint Paul, Minn	0	0	------	0	44	0	3	0	2	0	0	14
Salt Lake City, Utah	0	0	------	0	261	0	2	0	0	0	0	17
San Antonio, Tex	0	0	1	0	13	0	3	0	0	0	0	2
San Francisco, Calif	2	0	2	0	218	0	9	0	6	0	0	19
Savannah, Ga	0	0	------	0	0	0	0	0	0	0	0	0
Seattle, Wash	0	0	------	0	351	0	1	0	1	0	0	11
Shreveport, La	1	0	------	0	2	0	0	0	0	0	0	0
South Bend, Ind	0	0	------	0	0	0	0	0	4	0	0	1
Spokane, Wash	0	0	------	0	68	0	1	0	1	0	0	6
Springfield, Ill	0	0	------	0	3	0	0	0	2	0	0	0
Springfield, Mass	0	0	------	0	35	0	3	0	14	0	0	5
Superior, Wis	0	0	------	0	1	0	0	0	1	0	0	0
Syracuse, N. Y	0	0	------	0	483	0	1	0	2	0	0	62
Tacoma, Wash	0	0	------	0	27	0	1	0	3	0	0	2
Tampa, Fla	0	0	------	0	3	0	1	0	0	0	0	1
Terre Haute, Ind	0	0	------	0	2	0	1	0	1	0	0	0
Topeka, Kans	0	0	------	0	6	0	0	0	3	0	0	2
Trenton, N. J	0	0	------	0	0	0	2	0	6	0	0	9
Washington, D. C	1	0	------	0	41	1	8	0	6	0	1	24
Wheeling, W. Va	0	0	------	0	2	0	0	0	1	0	0	0
Wichita, Kans	0	0	------	0	50	0	2	0	1	0	0	9
Wilmington, Del	0	0	------	1	2	0	0	0	0	0	0	0
Wilmington, N. C	0	0	------	0	0	0	2	0	0	0	0	20
Winston, Salem, N. C	0	0	------	0	3	0	0	0	2	0	0	2
Worcester, Mass	0	0	------	0	2	0	7	0	19	0	1	49

Anthrax.—Cases: Camden, 1.
Dysentery, amebic.—Cases: Detroit, 4.
Dysentery, bacillary.—Cases: Detroit, 1; Los Angeles, 3.
Leprosy.—Cases: Memphis, 1; San Francisco, 1.
Rocky Mountain spotted fever.—Cases: Lynchburg, 1; Missoula, 1; Salt Lake City, 1; Springfield, Ill. 1; Springfield, Mass., 1.
Typhus fever.—Cases. Los Angeles, 1; New York, 1.

Rates (annual basis) per 100,000 population, for the group of 90 cities in the preceding table (estimated population, 1942, 34,134,198)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended June 13, 1942	9.93	3.97	1.22	630.59	34.37	111.67	0.00	3.36	202.56
Average for week, 1937–41	13.43	6.33	2.93	[1] 606.27	50.79	180.32	1.70	4.63	190.51

[1] Median.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended May 30, 1942.—During the week ended May 30, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		1		4	3				1	9
Chickenpox	2	28	1	184	295	44	19	18	145	736
Diphtheria		17		20		7	3	3	4	54
Dysentery				7						7
German measles		1	5	18	46	6	16	10	12	114
Influenza		14			7	2	4		7	34
Lethargic encephalitis						1				1
Measles				388	265	127	34	17	33	864
Mumps		16		155	408	75	191	56	316	1,217
Pnemonia		11			3	2			7	23
Poliomyelitis							1			1
Scarlet fever	1	17	14	65	154	34	51	64	36	436
Tuberculosis		7	15	273	37		26		11	369
Typhoid and paratyphoid fever				24	8		1		1	34
Undulant fever				2	2			1	1	6
Whooping cough		11		214	71	1	3	6	87	393
Other communicable diseases		18		3	249	34	5		17	326

COSTA RICA

Communicable diseases—April 1942.—During the month of April 1942, certain communicable diseases were reported in Costa Rica as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chickenpox	10		Typhoid and paratyphoid fever	12	
Diphtheria	12	1	Whooping cough	89	
Measles	1,120	10			

CUBA

Habana—Communicable diseases—4 weeks ended May 30, 1942.—During the 4 weeks ended May 30, 1942, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	19	4	Rabies	3	3
Leprosy	1		Tuberculosis	10	
Malaria	5		Typhoid fever	45	7
Measles	21		Yaws	4	4
Poliomyelitis	6				

EGYPT

Infectious diseases—Fourth quarter 1941.—During the fourth quarter of 1941, certain infectious diseases were reported in Egypt as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	5		Measles	915	285
Cerebrospinal fever	17	11	Mumps	168	3
Chickenpox	89		Pneumonia	852	890
Diphtheria	1,198	561	Poliomyelitis	2	
Dysentery	1,022	147	Puerperal septicemia	86	56
Erysipelas	647	75	Scarlet fever	28	
Influenza	1,967	37	Tuberculosis	1,454	925
Leprosy	114	22	Typhoid fever	1,251	253
Lethargic encephalitis	2	2	Typhus fever	730	132
Malaria	2,531	42	Whooping cough	327	15

Vital statistics—Fourth quarter 1941.—Following are the numbers of births and deaths for the fourth quarter of 1941 for all localities of Egypt having a health bureau:

Number of live births	58,910
Births per 1,000 population	46.3
Deaths, all causes	35,692
Deaths per 1,000 population	28.1
Deaths under 2 years of age	7,801
Deaths under 2 years of age per 1,000 live births	132

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Typhus Fever

Bulgaria.—During the week ended May 16, 1942, 47 cases of typhus fever were reported in Bulgaria.

Hungary.—During the week ended May 30, 1942, 28 cases of typhus fever were reported in Hungary.

Iraq.—For the week ended May 16, 1942, 15 cases of typhus fever were reported in Iraq.

Irish Free State—Mayo County—Westport.—During the week ended May 16, 1942, 3 cases of typhus fever were reported in Westport, Mayo County, Irish Free State.

Morocco.—During the week ended June 6, 1942, 854 cases of typhus fever were reported in Morocco.

Rumania.—During the week ended June 13, 1942, 78 cases of typhus fever were reported in Rumania.

Spain.—During the week ended May 23, 1942, 25 cases (8 in Barcelona) of typhus fever were reported in Spain. For the week ended May 16, 1942, 35 cases (10 in Barcelona) of typhus fever were reported.

COURT'S DECISION ON PUBLIC HEALTH

Nuisance—dumping of garbage on farm—power of local board of health—statute upheld.—(Iowa Supreme Court; *State* v. *Strayer*, 299 N.W. 912; decided September 23, 1941.) The defendant was the operator of a farm and engaged in raising hogs. He fed them garbage which was obtained from various sources and deposited upon his land. The board of health of the township in which the defendant's farm was located, without notice having been served upon the defendant, found that a nuisance existed by reason of the dumping of the garbage and ordered the removal of such nuisance from the premises. It was alleged that the defendant failed to comply with the order and 2 months after the order he was charged with violating chapter 107 of the 1939 Iowa Code, section 2228 et seq., by hauling garbage to his place in violation of the board's order. The said code chapter provided for the organization, powers, and duties of boards of health and section 2240 provided that the local board could order the owner, occupant, or person in charge of any place to remove at his own expense any nuisance found thereon, by serving on such person a written notice stating some reasonable time within which the removal should be made, and if there was failure to comply with the order the board could cause the same to be executed at such person's expense. Section 2246 made it a misdemeanor to violate knowingly any provision of the chapter or of the rules of the board or any lawful order of the said board or of its officers or authorized agents.

From a ruling by the lower court sustaining a demurrer to the information the State appealed to the Supreme Court of Iowa. The latter court held that the statute under consideration was a valid exercise of the police power of the State and was not a delegation of the legislative power in permitting the local board of health to pass upon the question of whether or not a certain condition constituted a nuisance or was detrimental to the health of the community.

Another point passed upon by the appellate court related to the right of the board, without notice or opportunity for hearing, to declare a nuisance and order its abatement. The defendant's contention respecting this was that an ex parte determination of facts as to a nuisance which was not such per se was a denial of due process of law. However, in this also, the court ruled against the defendant, stating that he was not without remedy and pointing out that, if he failed to comply with the order and was made the subject of criminal prosecution, he had his day in court in such proceeding on the question whether the dumping of garbage on his farm constituted a nuisance. Nothing in the statute, said the court, grants to the officers immunity from the consequences of unfair or oppressive acts. "The particular form of procedure prescribed may vary from the customary procedure,

but essential rights are not violated by granting to the board the right, in an emergency, to proceed in the abatement of a nuisance detrimental to public health, and it is safe to say that most cases calling for action on the part of the board of health are matters requiring immediate attention." The court then went on to say that, while the courts had not been uniform in their holdings, it believed that the weight of authority, as well as reason and necessity, prescribed that in cases involving the public health, where prompt and efficient action was necessary, the State or its officers should not be subjected to the inevitable delays incident to a complete hearing before action could be taken. "The enforcement of quarantine regulations to avoid the risk of an epidemic is a situation in point; and a public nuisance of the nature claimed in this proceeding is also a menace, not only to comfort but to health. In such cases, so far as consistent with constitutional rights, the public interest should prevail against the interest of the individual."

The ruling of the lower court was reversed.

Food—adulterated—sale in violation of statute.—(Kansas Supreme Court; *State* v. *Hupp*, 118 P.2d 579; decided November 8, 1941, rehearing denied December 11, 1941.) The statutes of Kansas made it unlawful to sell, keep for sale, or offer for sale any article of food which was adulterated and provided that one instance in which an article of food should be deemed to be adulterated was if it were the product of a diseased animal or one that had died otherwise than by slaughter. In a criminal prosecution for the sale of adulterated food consisting in whole or in part of the product of a diseased animal, in violation of the said statutory provisions, the Supreme Court of Kansas held that it was not necessary for the State to charge and prove that the sale was to a particular person.

City ordinance on garbage collection upheld.—(Arkansas Supreme Court; *Geurin* v. *City of Little Rock*, 155 S.W.2d 719; decided November 17, 1941.) An ordinance of the city of Little Rock provided for the collection of garbage, waste, trash, and refuse in the city. The appellant was convicted of violating this ordinance and his appeal to the Supreme Court of Arkansas involved the constitutionality of the ordinance.

One of his contentions was that the ordinance was void because it levied an illegal tax and made failure to pay this illegal tax a criminal offense. The court said that the legislature had granted to cities the power to prevent injury or annoyance within their limits from anything dangerous, offensive, or unhealthy and that, in questions of the kind before the court previously, it had always been held that a city had the power to provide by proper ordinance for the removal, at suitable intervals, of garbage, etc. At the time the city council

passed the instant ordinance it was not possible for it to have known exactly what the expense of collecting the garbage, etc., would amount to and its duty in this respect was to make a fair, reasonable estimate. If, said the court, when it had done this, the amount collected happened to be in excess of the necessary amount, the ordinance would not for that reason be void.

Another of the appellant's contentions with which the court disagreed was that the ordinance was void because it provided for imprisonment for debt. The ordinance "provides for punishment for the violation of law, just as it is provided if one is charged with false pretenses, in which case he is not imprisoned for debt, but for a violation of the law."

Also rejected was the argument that the ordinance imposed excessive fines and cruel and unusual punishment.

The supreme court concluded that the ordinance was valid, saying that "One of the most important fields of legislation that may be enacted under the police power is that of regulations in the interest of public health" and that "If a city could not enact laws of this sort to protect the health of its citizens, any kind of disease might be permitted to spread among the inhabitants, resulting in great damage."

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

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Public Health Reports

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Public Health Reports

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A STUDY OF THE "SKIN TEST" WITH MENINGOCOCCUS TOXINS IN A GROUP OF BOYS [1] [2]

By ARTHUR PARKER HITCHENS, *Lieutenant Colonel, Medical Corps, United States Army,* SARA E. BRANHAM, *Senior Bacteriologist, United States Public Health Service,* and MANLY B. ROOT, *Physician-Psychiatrist, National Training School for Boys, Washington, D. C.*

INTRODUCTION

During the fall and winter of 1936–37, 6 cases of meningococcus meningitis, 3 of which were fatal, and 1 case of a low grade meningococcus septicemia occurred at the National Training School for Boys in the District of Columbia. In April 1937 the authors were given an opportunity to study the situation there.

The National Training School, on the outskirts of Washington, D. C., has an average enrollment of about 400 boys, including white and colored. Their ages range between 12 and 18 years, the majority of the boys being 15, 16, or 17 years of age. The average stay in the school is about 18 months, with an annual turn-over of about 150. The boys are housed in 7 "cottages," with about 60 in each, and they eat in a central dining hall. The 7 cases of meningococcus infection were distributed among 3 of the cottages. Only white boys were involved in this outbreak; colored boys showed no evidence of infection.

In an effort to identify the reservoirs of meningococcus infection at the school, studies were begun by making nose and throat cultures from the 4 convalescents who remained in the institution, and from 3 other boys who had been in close contact with the patients and who had lived in the 3 cottages involved. The technique used was that described in "Diagnostic Procedures and Reagents," published by the American Public Health Association (*1*). At the same time skin tests were made with meningococcus toxins supplied by Dr. N. S. Ferry (*2*). Five of these 7 boys were found to harbor meningococci, 4 carrying Group I and 1 Group II (a contact). One convalescent and 1 contact were negative. Several weeks later the cultures were repeated on the 5 boys who were still available. One convalescent remained positive.

[1] From the National Institute of Health and the Army Medical School.

[2] Submitted for publication April 24, 1941.

It has been observed (3) that the epidemic type of meningococcus infection is nearly always due to meningococci of Group I, whereas Group II strains are more commonly found in endemic cases. The one strain of Group II in this series was found in one of the contacts (J. E.) and it is therefore improbable that he had any relation to the outbreak; but seemingly identical Group I strains, from 3 convalescents and 1 contact, are probably significant. Unfortunately, the serological group of the strains from the active cases had not been determined; the cultures were not available at the time these studies were begun.

Table 1 summarizes this brief study and also gives the results of the skin tests with Ferry's toxin, which were performed at the same time.

TABLE 1.—*Study of nasopharyngeal cultures from convalescents and their contacts*

Name	Culture for meningococcus	Skin test reaction to toxin I	Skin test reaction to toxin II
Convalescents:	*Group*		
F. R.	Negative	Negative (8×8 [1])	Positive (15×12 [1])
D. B.	Positive I	Negative (5×6)	Negative (8×10).
B. R.	Positive I	Negative (0×0)	Positive (10×15).
D. W.	Positive I	Negative (8×10)	Negative (8×10).
Contacts:			
C. L.	Negative	Negative (0×0)	Negative (0×0)
H. P.	Positive I	Positive (12×14)	Positive (14×14)
J. E.	Positive II	Positive (10×10)	Positive (10×10).

[1] Area of skin reaction in mm. Positive reaction = 10×10 mm or more.

The 4 convalescents were skin-test negative for the Group I toxin, and all except 1 were carrying Group I meningococci. Two of these convalescents were positive to the Group II toxin. Two of the contacts were skin-test positive for both toxins; 1 contact was negative throughout.

It was impracticable to make a carrier survey of the entire school or even of the cottages involved. Then, too, with the advent of spring weather, cases had ceased to occur. However, the opportunity seemed to be an excellent one to study the reaction to intracutaneous injections of meningococcus toxins in a group which recently had had an encounter with meningococcus meningitis. Should a positive skin reaction actually indicate susceptibility and a negative reaction following it in the same individual, after a series of injections, indicate immunity, this toxin might prove an agent of great value in controlling meningococcus infection during epidemic years.

Proof of the value of a skin test as a measure of susceptibility is not easy to acquire with a disease like epidemic meningitis in which outbreaks are explosive and rapid in course, and in which such low incidence of meningeal invasion is found during endemic periods. It seemed that a study of the skin test in a group such as that found in

the National Training School for Boys might yield data from which information could be gained if the next winter should bring another outbreak of meningococcus infection to this same group.

HISTORY

Skin tests with meningococcus culture filtrates were made in 1925 by Erlich, Popowski, and Przesmycki (*4*), and in 1927 by Herrold and Traut (*5*). They found that in about one-half of the individuals tested a zone of erythema and edema was produced.

In 1931, Ferry, Norton, and Steele (*2*) reported the presence of a soluble toxin in filtrates of certain strains of meningococci when cultivated by a special technique. Intradermal injections of dilutions of these filtrates gave skin reactions in a considerable number (approximately one-half) of their subjects. These authors themselves were the first to discuss the uncertainty of the significance of cutaneous reactions—whether a definite skin reaction indicated susceptibility to toxin or to meningococcus infection, or whether it was an indication of immunity. They found that positive or negative reactors persisted as such although there was a tendency for positive reactors to become gradually negative with repeated testing. Later they came to the conclusion that a positive skin reaction indicated susceptibility to the toxin in a manner analogous to that indicated by the Schick and Dick reactions. They based their opinion upon the following evidence: (*a*) Positive reactors became negative after a series of subcutaneous injections of undiluted toxin (*6*); and (*b*) positive skin reactions were partially neutralized by means of serum from horses immunized with the meningococcus toxins (*7*).

MATERIALS AND TECHNIQUE

Doctor Ferry generously kept us supplied with his standard diagnostic meningococcus toxins freshly titrated. His dosage and technique of performing and reading the skin tests were followed closely (*2*). Dilutions were made in 0.85 percent NaCl solution, and 0.1 cc. was injected intracutaneously—Group I toxin on the right forearm and Group II toxin on the left. The injections were made in the early or mid-afternoon.

Readings were made at about 8 o'clock on the following morning, and the size of the erythematous area, the intensity of color, and the amount of edema or infiltration were all recorded. Doctor Ferry's criterion of an area of erythema, 10 x 10 mm., was adopted as our own criterion of a positive reaction.

With the colored boys intense pigmentation of the skin sometimes masked the erythema. In such cases we had to depend upon the local edema, a very slight degree of which was conspicuous.

In some instances a fairly small and vivid central area of erythema was surrounded by a fainter and less well demarcated areola. Several persons who had previously had meningococcus meningitis gave very small and intensely red reactions. This raises the question as to whether or not we were dealing in these cases with an allergic state, a question which, of course, we are unable to answer.

RESULTS OF TESTING

Four hundred and ninety boys were tested at least once, 130 of them at least twice, and 42 of them three or four times. Table 2 shows the results obtained in the first testing of the entire school during the autumn of 1937, and of the newcomers in the early spring of 1938. It can be seen that over one-half of the total number of boys (52.7 percent for Group I and 67 percent for Group II) gave reactions regarded as positive with the toxins and that a larger number was positive to Group II toxin than to Group I. Analysis of this table shows a larger percentage of reactors among the colored boys.

TABLE 2.—*First testing of boys from National Training School*

Date	No. of boys tested			Positive to Group I						Positive to Group II					
				White		Colored		Total		White		Colored		Total	
	White	Colored	Total	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
September 22, 1937	56	45	101	21	37.5	21	46.6	42	41.5	30	53.6	36	80.0	66	65.3
September 29, 1937	3	100	103	3	100.0	80	80.0	83	81.0	2	66.7	80	80.0	82	79.6
October 20, 1937	111	3	114	40	38 1	0	0	40	35.1	70	63 1	1	33.3	71	62 3
November 3, 1937	61	22	83	28	46.0	11	50.0	39	47.0	32	52 5	16	72.7	48	57.8
April 6, 1938	--	53	53	-	-	36	68 0	36	68.0		- -	37	69.8	37	69.8
April 15, 1938	81	2	83	42	51 9	1	50.0	43	51.8	56	69.1	0	0	56	67.5
Total	312	225	537	134	42.3	149	66.2	283	52.7	190	61.0	170	76.0	360	67.0

One hundred and thirty white boys were tested more than once. The first tests were made during a 6-week period beginning September 22. Fifty-two of these boys received the second tests on March 23, approximately 6 months after the first. The same result was obtained in 70 percent of them, and was practically the same with both test toxins. The shift from positive to negative, and from negative to positive, occurred approximately an equal number of times, i. e., positive to negative with toxin I, 7 times, toxin II, 8 times; from negative to positive with toxin I, 7 times, toxin II, 8 times.

Other boys were retested at varying intervals. Table 3 shows the results in 21 boys tested four times with Group I toxin. Although

the numbers are much too small to serve as the basis for a conclusive statement, there will be noted, in the case of most of these boys, an apparent tendency for positive reactors to become negative after repeated testing. Of the 10 boys who gave positive reactions with Group I toxin when tested in September, 8 gave smaller reactions upon subsequent testing, finally showing negative, 5 as early as the second injection. On the other hand, 6 of 11 boys who were negative to toxin I in September became positive in March, while 3 of the other 5 negative boys gave increased reactions in March, although their reactions were still smaller than the arbitrarily chosen 10 x 10 mm. area. Four of the 6 March reactors were again negative in April and remained so in July, i. e., boys Nos. 15, 36, 43, and 47. It may be seen from the percentages reported in table 3 that 47.6 percent of the boys were positive in September and 52.4 percent positive in March, but that this rate had dropped to 42.9 percent in April, and to 19.0 percent in July. The reaction in 4 boys, Nos. 14, 17, 21, and 42, remained the same throughout.

TABLE 3.—*Repeated testing with Group I toxin*

Subject tested	Dates of testing: Sept. 22, 1937		Mar. 23, 1938		Apr. 15, 1938		July 11, 1938	
	Area of reaction in millimeters							
	18×25	(+)	9×10	(0)	9×10	(0)	8×8	(0)
	12×25	(+)	9×9	(0)	9×10	(0)	0×0	(0)
5	9×12	(+)	7×8	(0)	6×9		5×6	(0)
7	11×14	(+)	6×10	(0)	12×11		5×5	(0)
11	20×70	(+)	15×21	(+)	14×13		0×0	(0)
14	11×12	(+)	10×23	(+)	12×11		10×12	(+)
15	0×0	(0)	14×18	(+)	8×10		6×6	(0)
16	5×6	(0)	7×8	(0)	5×7		11×11	(+)
17	6×6	(0)	7×10	(0)	5×6		8×7	(0)
18	12×14	(+)	8×10	(0)	10×9		2×2	(0)
21	13×20	(+)	15×15		12×15		10×12	(+)
33	0×0	(0)	12×20		12×14		7×7	
36	6×7	(0)	15×22		9×9		9×10	
40	11×11	(+)	10×14		11×11		10×7	
42	5×9	(0)	9×9		8×10		8×8	
43	0×0	(0)	10×12		7×9		8×9	
45	7×9	(0)	0×0		11×12		6×8	
47	0×0	(0)	10×12		9×9		8×10	
53	0×0	(0)	16×21		9×12		5×10	
54	10×12	(+)	11×13		12×15		2×2	
55	9×9	(0)	9×9		8×10		13×11	(+)
Percent positive		47.6		52.4		42.9		19 0

Table 4 shows that the reaction to toxin II was similar but less regular. Of the 9 boys who gave a positive reaction with toxin II on the first testing, 2 gave progressively smaller reactions with each subsequent test, becoming completely negative. Fifteen showed a higher reactivity during March or April. By July only 1 of these 21 boys was positive to toxin II.

TABLE 4.—*Repeated testing with Group II toxin*

Subject tested	Dates of testing			
	Sept. 22, 1937	Mar. 23, 1938	Apr. 15, 1938	July 11, 193
	Area of reaction in millimeters			
1	20×32 (+)	15×17 (+)	9×10 (0)	0×0 (
3	13×15 (+)	6×7 (0)	12×11 (+)	0×0 (
5	10×12 (+)	8×10 (0)	11×13 (+)	0×0 (
7	10×14 (+)	12×15 (+)	10×12 (+)	0×0 (
11	17×30 (+)	8×10 (0)	13×15 (+)	10×10 (-
14	6×8 (0)	6×8 (0)	11×12 (+)	6×9 (
15	0×0 (0)	12×14 (+)	11×11 (+)	0×0 (
16	0×0 (0)	15×13 (+)	11×16 (+)	0×0 (
17	5×6 (0)	3×5 (0)	----------- --	4×4 (
18	13×13 (+)	10×10 (+)	6×5 (0)	2×2 (
21	5×8 (0)	30×32 (+)	11×16 (+)	0×0 (
33	15×18 (+)	8×9 (0)	15×22 (+)	7×7 (
36	16×19 (+)	18×21 (+)	13×7 (+)	0×0 (
40	7×10 (0)	10×13 (+)	17×23 (+)	0×0 (
42	9×8 (0)	7×10 (0)	12×11 (+)	0×0 (
43	0×0 (0)	8×15 (+)	8×10 (0)	0×0 (
45	12×16 (+)	8×10 (0)	10×12 (+)	0×0 (
47	7×8 (0)	5×7 (0)	12×13 (+)	0×0 (
53	3×5 (0)	8×10 (0)	12×10 (+)	0×0 (
54	0×0 (0)	11×15 (+)	19×26 (+)	2×2 (
55	3×5 (0)	8×10 (0)	12×10 (+)	0×0 (
Percent positive	42 9	47.6	80.9	4

The apparent increasing susceptibility from September through March and April, with a dropping off by the time of the July tests may indicate seasonal differences in the skin connected with its function as part of the temperature regulating mechanism. Likewise there are many problems concerned with the mechanism of the allergic state which complicate all such studies. We feel that the figures should be reported without an attempt at explanation.

DISCUSSION AND SUMMARY

At the time this work was started, there was some reason to think that we had an excellent opportunity for ascertaining the value or significance of skin tests in determining susceptibility to meningococcus infection. Here was a self-contained institution with 400 inmates, each one in residence for a period of about 18 months. Meningococcus meningitis had appeared in the institution and carriers were still present. It would not have been surprising if more cases had occurred; still more might have been expected to occur during the following winter. As a matter of fact there have been no more cases.

It was felt that if we tested all the boys when in residence and continued periodically to test new arrivals data would be available upon which evaluation of the test could be made, should any cases of meningococcus meningitis occur. It was when we returned to test new arrivals that it occurred to us to reinject some of the boys already tested; the irregular results suggested further repetition. We are

therefore not attempting to offer an explanation; a great deal more work is needed before deductions of any kind can be made. The interesting possibility of a seasonal variation in skin reactivity is suggested by some of the results.

We did not have an opportunity to relate the reactions to the susceptibility of individuals to specific meningitis; we made preparations for an outbreak which did not occur. Until advantage can be taken of such a sequence of events, the value of these skin tests in ascertaining susceptibility to meningococcus infection cannot be appraised.

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STUDIES ON BACTERICIDAL AND PHAGOCYTIC ACTIVITY OF NORMAL HUMAN BLOOD ON MENINGOCOCCI IN RELATION TO THE "SKIN TEST" WITH MENINGOCOCCUS TOXINS [1]

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HISTORY

In the preceding paper (*1*) the authors reported studies on the local reaction produced by the intracutaneous injection of meningococcus culture filtrate in a group of boys ranging in age from 12 to 18 years. Proof of any relationship between the reactions elicited and immunity or susceptibility to meningococcus infection was not forthcoming because no cases of meningitis developed in the group subsequent to the testing. It seemed that additional information might be obtained by comparing these reactions with other immunological phenomena in the same individuals.

As early as 1905 Davis (*2*) noted the bactericidal action of human blood upon meningococci. He found considerable individual varia-

[1] From the National Institute of Health and the Army Medical School.
[2] Submitted for publication April 24, 1941.

tion in this respect among normal people and noted the marked bactericidal action of the blood of three persons convalescing from meningococcus meningitis. This was before serum therapy had been introduced. He suggested a relation between bactericidal action and immunity to meningococcus infection.

Matsunami and Kolmer (*3*), in 1918, studied the bactericidal action of the blood of man, rabbits, guinea pigs, and mice. They found that the bactericidal activity seemed to be related to a species resistance to meningococcus infection, i. e., the blood of rabbits was most bactericidal, whereas rabbits were most resistant; that of mice least bactericidal. The blood of man was less bactericidal than that of rabbits and more like that of mice and of young guinea pigs. Blood from young children was less bactericidal than that from adults. There was much individual variation in this respect among human beings. These authors interpreted their findings as evidence that bactericidal action and resistance to the meningococcus occur together.

Heist and his co-workers (*4*), in 1922, studied the bactericidal action of the whole blood of 172 young men. They found that recently isolated spinal fluid strains multiplied in the blood more readily than carrier strains and that the bactericidal property of blood varied widely. They believed that bactericidal action was a measure of resistance.

Silverthorne and Fraser (*5*), in a study of 50 samples of human blood, found those from most adults bactericidal for meningococci to a high degree, whereas those from most infants were not. They found that the blood of two infants which was originally not bactericidal became definitely so after therapeutic serum was given, whereas the blood of another became bactericidal after an attack of meningococcus meningitis. They found virulent newly isolated cultures to be less readily killed than older ones. They studied the blood of guinea pigs before and after vaccination (*6*) with new spinal fluid strains of meningococci and found that marked bactericidal action developed in the vaccinated animals. They found (*7*) that mouse virulent strains of meningococci survived and multiplied in nonbactericidal blood, whereas those that were nonvirulent for mice did not do this.

Later, Silverthorne (*8*) made further studies with vaccinated and unvaccinated guinea pigs and also with a group of vaccinated babies. He interpreted his findings as evidence that the bactericidal property of blood and immunity to meningococcus infection are related.

BACTERIAL TESTS

It seemed to us that an attempt to correlate the "skin test" reactions of the boys we had studied with the bactericidal activity of their blood

might yield information of value concerning susceptibility and resistance to meningococcus infection.

Fifty boys were included in the study. All of these had been given "skin tests" with Group I and Group II meningococcus toxins more than once, most of them three and four times. These tests have been discussed in the preceding paper (*1*). Positive and negative subjects were chosen for the present investigation. The intracutaneous reactions were studied during the period from September 1937 to July 1938; determination of the bactericidal activity of the blood was made from June to December 1938.

Samples of blood were collected and handled as follows: Nine cc. of venous blood was drawn into a syringe containing 1 cc. of 10 percent sodium citrate. The bleedings were taken before breakfast. Four samples were included in each experiment. The tubes of citrated blood were packed in ice and transported at once to the National Institute of Health laboratory where they were kept on ice until the tests were set up, at about 1 p. m.

Eighteen strains of meningococci were used, 9 of Group I and 9 of Group II. One (1112–II) was from a current case of meningococcus septicemia at Walter Reed Hospital; 2 (1027–I and 963–II) were strains that were used routinely for evaluating therapeutic sera by the mouse protection method and were maintained in the laboratory at maximum virulence for mice; 13 were recently isolated strains that had been stored in a lyophile state while of high virulence; 2 (331–I and 173 II) were old stock strains representing the Gordon-Murray Types I and II. These 18 cultures were transferred daily on rabbit blood agar and tested for virulence in mice from time to time. Five-hour blood agar slant cultures were used for the tests.

In setting up the tests the technique described by Silverthorne (*8*) was followed with a few slight modifications. Ordinary agglutination tubes were used, plugged with cotton and sterilized by heat. The amount of whole citrated blood placed in each tube was 0.2 cc. Six dilutions of each culture were used with every blood sample. A suspension of a 5-hour culture of each strain to be used was made in a meat infusion-peptone broth and diluted by comparison of its turbidity with silica standards so that the average dilution corresponding with 1,000 parts per million of silica contained about 2,000,000,000 meningococci per cubic centimeter. From this starting point 6 further tenfold dilutions in broth were made; dilution 10^{-1} contained approximately 200,000,000 and 10^{-6} contained 2,000 meningococci per cubic centimeter. The amount of culture added to each tube was 0.02 cc., making the number of meningoccoci added to the whole blood range from 4,000,000 to 40. A loopful of each of the two highest broth dilutions of each strain was plated out on blood agar to get an idea of numbers and viability of organisms present at the time the test was

set up, and all dilutions were incubated overnight and examined for growth and purity the next day.

A series of tubes in which the blood was replaced by broth was set up to act as a control of the viability and multiplication of the microorganisms under the conditions of the experiment. The tubes containing the whole blood and culture dilutions, as well as the "control" set, were well shaken and incubated in a water bath at 37° C. The same platinum loop was used for this purpose throughout the studies. Eight tubes were inoculated on each blood agar plate. Results were recorded as 0, 1+, 2+, 3+, and 4+, although fewer than five colonies were recorded by number; 4+ indicated confluent growth.

Among the 50 boys studied, all were tested at least twice; 23 were tested 3 times, and 4 were tested 4 times. The results were constant.

In accord with the experience of previous workers, we found virulence to be an important factor. In table 1 the virulence of 16 strains at the time of the experiments is expressed in the extreme right-hand column by the dilution of the culture (1 cc.) required to kill a 16–20 gram mouse in 48 hours. Maximum virulence is represented by dilution 10^{-9} (2–10 meningococci). Three strains of lower virulence were markedly inhibited by all samples of blood. These were: 173, of virulence 10^{-4} (200,000 meningococci per cubic centimeter), 933, of virulence 10^{-5} (20,000 meningococci per cubic centimeter), and 331, of virulence 10^{-6} (2,000 meningococci). Strain 933 did not grow in the blood from any of the 50 boys studied. This relation of virulence and bactericidal action was found with all of the 50 blood samples studied. When a strain that had been growing in all samples suddenly began to be killed in the tests, the virulence for mice was invariably found to be decreased.

Even more conspicuous than this greater susceptibility of less virulent strains to bactericidal action was an individual difference among the very virulent strains of meningococci in their ability to survive and multiply in blood. Certain strains of high virulence, as measured in mice, were regularly much more easily destroyed by whole human blood than others. In table 2 may be seen the action of 22 bloods on 4 strains of meningococci which were all of maximum virulence for mice at the time of the tests. Group I strain 1041 was completely destroyed by 14 of the bloods in all dilutions used and in others survived only in those tubes given an inoculum of 2,000,000 to 20,000,000 microorganisms. The only blood in which there was no evidence of bactericidal action for this spinal fluid strain was No. 15. This blood showed no bactericidal properties for any strain. A contrast to strain 1041 is found in Group II strain 1112 which had been recovered from the blood of a fatal case of meningococcus septicemia. This strain grew well in nearly all bloods tested. Definite bactericidal action for strain 1112 was seen in only 4 bloods but these also showed

TABLE 1.—*Bactericidal action of blood from 5 boys upon 16 strains of meningococci, skin reaction of these boys to meningococcus, virulence of the meningococci for mice*

	No. 18				No. 22				No. 7				No 11				No. 9				Mouse virulence of the strains studied
	Bactericidal action on meningococci																				
Skin reaction to control toxin (July 1938):																					
I	Negative				Positive				Negative				Negative				Negative				
II	Negative				Positive				Negative				Positive				Negative				
	Dilutions of the test cultures																				
Test strain used	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	
Group II:																					
173	1+	1+	[1] 0	0	2+	1+	1+	1+	1+	0	0	0	0	0	0	0	1+	0	0	0	10^{-4}
933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10^{-6}
964	4+	4+	4+	4+	4+	4+	4+	3+	4+	4+	4+	4+	4+	4+	4+	4+	3+	3+	0	0	10^{-8}
1054	1+	0	0	0	4+	1+	1+	0	0	0	0	0	1+	0	0	0	4+	3+	1+	1+	10^{-8}
1087	0	0	0	0	4+	4+	4+	3+	3+	3+	0	0	3+	2+	1+	1+	3+	2+	1+	1+	10^{-8}
1108	3+	0	0	0	3+	1+	1+	0	0	0	0	0	0	0	0	0	2+	2+	0	0	10^{-8}
1112	2+	1+	1+	0	3+	3+	3+	3+	3+	3+	3+	2+	3+	2+	2+	0	2+	1+	0	0	10^{-8}
Group I:																					
331	1+	0	0	0	1+	1+	0	0	2+	0	0	0	2+	1+	0	0	0	0	0	0	10^{-8}
973	4+	4+	4+	4+	4+	4+	4+	4+	3+	2+	1+	0	0	0	0	0	2+	1+	0	0	10^{-8}
1004	4+	4+	4+	4+	4+	4+	4+	4+	4+	3+	3+	3+	3+	1+	1+	0	4+	4+	4+	3+	10^{-8}
1010	4+	4+	4+	4+	4+	4+	4+	4+	4+	4+	4+	3+	4+	4+	4+	4+	0	0	0	0	10^{-8}
1027	4+	4+	4+	4+	4+	4+	4+	4+	2+	2+	2+	0	0	0	0	0	0	0	0	0	10^{-8}
1037	3+	3+	1+	1+	[illegible]	4+	4+	1+	1+	0	0	0	0	0	0	0	1+	1+	0	0	10^{-8}
1038	4+	4+	3+	3+	4+	4+	4+	4+	4+	4+	4+	4+	4+	4+	4+	4+	3+	3+	1+	1+	10^{-8}
1041	0	0	0	0	3+	2+	2+	1+	0	0	0	0	1+	1	0	0	0	0	0	0	10^{-8}
1046	4+	2+	2+	2+	4+	3+	3+	2+	4+	4+	4+	3+	4+	4+	4+	4+	0	0	0	0	10^{-8}

[1] 0 indicates no growth   Figures 1 to 4 indicate degrees of growth (4 indicates confluent growth).

marked inhibitory properties for all other strains studied. Group II strain 1087 from spinal fluid of a fatal case was also relatively resistant to bactericidal action, behaving very much like strain 1112, whereas Group I strain 1027 was destroyed more frequently, though it was less susceptible than Group I strain 1041. This apparently greater susceptibility of Group I meningococci is not a constant but merely a chance occurrence related to those strains selected for this study.

TABLE 2.—*Bactericidal action of the blood from 22 boys upon meningococci and the response of these boys to intracutaneous injection*

Blood sample	Skin test reaction		Strain 1027 (I)				Strain 1112 (II)				Strain 1041 (I)				Strain 1087 (II)			
	I	II	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-3}	10^{-4}	10^{-5}	10^{-6}
1	–	–	2+	1+	1+	1+	3+	3+	3+	2+	0	0	0	0	4+	4+	4+	4+
2	+	+	1+	1+	0	0	4+	4+	3+	2+	0	0	0	0	1+	1+	1+	1+
3	–	–	1+	0	0	0	4+	4+	3+	2+	0	0	0	0	4+	4+	4+	4+
4	+	+	1+	1+	1+	1+	4+	4+	3+	3+	0	0	0	0	4+	4+	4+	4+
5	–	+	3+	3+	2+	0	3+	3+	3+	1+	3+	2+	0	0	3+	3+	2+	0
6	+	+	4+	4+	4+	3+	4+	4+	2+	2+	0	0	0	0	3+	0	0	0
7	–	–	2+	2+	2+	0	3+	3+	3+	2+	0	0	0	0	3+	3+	0	0
8	+	+	3+	2+	2+	0	3+	3+	3+	2+	0	0	0	0	3+	3+	0	0
9	–	–	0	0	0	0	2+	1+	0	0	0	0	0	0	3+	2+	1+	1+
11	–	+	0	0	0	0	3+	2+	2+	0	1+	1+	0	0	3+	2+	1+	1+
12	+	+	3+	2+	1+	1+	3+	3+	3+	2+	4+	0	0	0	4+	4+	4+	3+
13	+	+	4+	4+	4+	1+	4+	4+	4+	4+	0	0	0	0	4+	4+	4+	4+
14	+	–	0	0	0	0	4+	4+	4+	4+	3+	2+	1+	1+	4+	4+	4+	4+
15	–	+	4+	4+	4+	4+	4+	4+	4+	4+	4+	4+	4+	4+	4+	4+	4+	4+
16	–	–	1+	1+	0	0	3+	2+	1+	0	0	0	0	0	3+	3+	2+	1+
17	–	–	1+	1+	0	0	3+	2+	0	0	0	0	0	0	2+	2+	1+	0
18	–	–	4+	4+	4+	4+	2+	1+	1+	0	0	0	0	0	0	0	0	0
19	+	+	1+	0	0	0	0	0	0	0	1+	0	0	0	3+	3+	0	0
21	+	+	4+	4+	4+	3+	3+	3+	3+	3+	2+	0	0	0	4+	4+	4+	4+
23	–	–	4+	4+	4+	4+	4+	4+	4+	4+	0	0	0	0	4+	3+	2+	2+
29	+	+	1+	1+	0	0	3+	2+	0	0	0	0	0	0	0	0	0	0
30	+	+	0	0	0	0	4+	4+	4+	2+	1+	0	0	0	3+	3	0	0

Besides this difference in behavior of individual strains, it can be seen in table 2 that the blood of some boys was definitely and consistently more bactericidal for all meningococci than was that of others; e. g., No. 15 seemed entirely devoid of bactericidal power under the conditions of the experiments, whereas Nos. 17 and 19 had marked bactericidal action.

It is impossible to present in complete detail all the data obtained in these studies since each person and strain tested reacted in an individual way. Representative cases have been chosen to illustrate the points in question. Further reference to table 1 shows more evidence of individual differences in both the bactericidal activity of the blood samples and in the susceptibility of the strains of meningococci. The bloods from Nos. 9 and 11 were markedly bactericidal for most strains, and that from No. 7 relatively so. Blood from No. 18 was chiefly bactericidal for Group II strains, whereas that from No. 22 showed practically no bactericidal action for either Group. Such results occurred regularly through many repetitions of the tests.

A difference in the resistance of individual strains of meningococci to bactericidal action is also seen in table 1. Strains 1004, 1038, 964,

and 1112 grew moderately well in all samples of blood; strains 1054, 1108, 1037, and 1041 were easily inhibited. Strains 1010 and 1046 were killed by only one sample of blood. All degrees of susceptibility to bactericidal action can be found. Just as many strains of Group II as of Group I were sensitive to bactericidal action. Serological grouping, in itself, does not seem to be a factor in susceptibility.

Greater bactericidal action in some individuals has been interpreted by earlier workers as an indication of resistance to meningococcus infection (*2, 3, 4, 5, 6, 8*). What kind of response do these individuals give to intracutaneous injection of meningococcus toxins? Is there any correlation between the "skin-test" reactions and the bactericidal activity of the blood?

In table 1 the skin-test reactions are included, expressed as positive or negative. A positive reaction indicates a zone of erythema at least 10 by 10 mm. in diameter. The technique of performing and of reading the test has been described in a preceding paper (*1*). Table 1 shows that blood from Nos. 7 and 9, who were skin-test negative to both toxins, was definitely more bactericidal than that from No. 22, who was skin-test positive to both toxins. The blood of No. 18 was much more bactericidal for Group II meningococci than for Group I, whereas this individual was skin-test negative for both Group II and Group I toxins. On the other hand, the blood of No. 11 was as bactericidal for both groups as any other blood shown in the table, yet this boy was skin-test positive with only Group II toxin.

In table 2 the reactions to intracutaneous injections of Group I and Group II toxins are, likewise, included. In some instances negative skin reactions and bactericidal activity were in agreement, i. e., Nos. 9, 16, 17, and 18. With Nos. 5 and 11 a negative reaction with Group I toxin only was associated with bactericidal activity for that Group only. On the other hand Nos. 19, 29, and 30 seemed to be equally bactericidal, although the skin reactions were positive at that time. Nos. 1, 2, 3, and 4 were very similar in bactericidal action, although 1 and 3 were skin-test negative and 2 and 4 were skin-test positive.

Table 3 summarizes the results obtained from the remainder of the 50 boys. Since so many strains of meningococci of varying degrees of sensitiveness were used, bactericidal action, recorded in the extreme right-hand column, is expressed in general terms, such as slight, moderate, none, etc. Six of the positive skin reactors showed no bactericidal action, 7 others exhibited slight or moderate action, while 7 negative reactors gave no bactericidal action, and 6 others gave slight to moderate effects. Thus in only about one-half of the subjects studied did a negative skin reaction correlate with bactericidal action.

ABLE 3.—*Summary of phagocytic activity and bactericidal action of blood fro 29 boys, and of their reaction to intracutaneous injection of meningococcus toxins*

Blood sample	Percentage of leucocytes containing meningococci					Skin test reactions		Bactericidal action
	I		II			I	II	
	1027	1041	1112	1087	963			
24	4	4	8	20	------	−	−	Slight.
25	0	4	4	0	------	−	−	None.
26	0	12	4	12	------	−	−	Slight.
27	4	0	12	0	------	+	+	Moderate
28	0	8	20	------	4	+	+	Slight.
29	0	8	20	------	0	+	−	Moderate.
30	0	8	20	------	0	+	+	Slight.
31	4	12	32	------	8	+	−	Inhibited I
32	0	0	------	0	8	+	+	Moderate.
33	0	4	------	0	4	+	+	None
34	0	0	------	0	0	+	+	Slight
35	0	0	------	4	0	+	+	None.
36	0	0	------	0	8	−	−	Moderate.
37	[1] 0	[1] 12	------	[1] 0	[1] 4	−	+	Do.
38	8	12	------	0	12	−	−	None.
39	0	8	------	[1] 0	16	+	+	Moderate
40	0	4	4	4	------	+	+	None
41	0	0	0	4	------	+	+	Do.
42	4	12	20	8	------	−	−	Moderate
43	4	12	32	0	------	−	−	None.
44	16	8	------	0	8	+	+	Do.
45	8	0	------	4	8	−	−	Do.
46	4	0	------	12	0	−	−	Slight.
47	0	4	------	0	0	−	−	Do.
48	0	4	------	4	8	+	+	None
49	4	0	------	[1] 8	4	−	−	Do.
50	[1] 0	4	------	0	4	−	−	Do.
51	4	4	------	16	0	+	+	Moderate
52	8	8	------	0	4	−	−	None.

[1] Large mononuclears actively phagocytic also

PHAGOCYTIC STUDIES

Early in the course of these studies it occurred to us that bactericidal activity in the blood might be correlated with phagocytic action and that simultaneous observations of these two immunological phenomena on meningococci, and of skin reactions to meningococcus toxins, might give information about their significance.

Thirty of the samples of whole citrated blood were also examined for phagocytic action, using 12 strains of meningococci. The technique used was a modification of that used by Evans (*9*) for the opsonocytophagic test in her studies of chronic brucellosis.

In the bactericidal tests, as described above, the whole blood was used, 0.2 cc. in each tube, and 0.02 cc. of various dilutions of the cultures 10^{-1} to 10^{-6} were added, and the mixtures shaken thoroughly. After 2 hours' incubation in a water bath at 37° C. the tubes containing the 10^{-1} dilution of culture were removed. A small amount of material was removed from each, using finely drawn capillary pipettes. A large drop was placed near one end of a clean glass slide and spread thickly by dragging the drop along the slide by means of another slide held at an angle. The preparations were air dried, the red cells dissolved by immersing the slides in a solution of 1-percent acetic

acid in 5-percent formalin, and the smear then stained with Bordet-Gengou's carbol toluidin blue.[3] The stain remained on for 30 to 60 seconds and was then rinsed off.

Evans' method of reading the slides was used as a guide. Twenty-five polymorphonuclear leucocytes, chosen from several well-separated areas, were examined and recorded as positive or negative. Percentages could be obtained by multiplying the number of positive or negative cells by 4.

The amount of phagocytosis found in 29 samples of blood for 5 strains of meningococci is recorded in table 3. These samples came from normal boys and the degree of phagocytosis demonstrable would not be expected to be great. It is interesting to note the variation in the different samples of blood in this respect; Nos. 31 and 43 showed 32 percent of the leucocytes with ingested meningococci of strain 1112, whereas No. 34 showed no sign of phagocytosis with any strain. Strain 1112 was more frequently taken up by the leucocytes than any other. Strain 1027 was least frequently phagocyted. In some samples the phagocytosis was negligible, in others slight but definite. In none was it comparable to that obtained by using the blood of immunized rabbits with the strains included in this study.

The large monocytes were quite active in phagocytosis in several samples of blood (i. e., Nos. 37, 39, 49, and 50), although the polymorphonuclear leucocytes were relatively inactive. This phenomenon was especially conspicuous in No. 37.

Examination of table 3 will show no regular correlation between phagocytosis and either skin reactions or bactericidal activity. There were some samples in which relatively active phagocytosis was associated with negative skin reactions, i. e., Nos 42, 43, 38, and 24; there were others where such phagocytic activity occurred with markedly positive skin reactions, i. e., Nos. 28, 31, and 51. In all of these the bactericidal action varied.

DISCUSSION AND SUMMARY

Samples of blood from individual boys varied considerably in bactericidal action upon meningococci. Equally conspicuous was the variation in susceptibility to bactericidal action among the different strains of meningococci. One factor in this variation was virulence; nonvirulent strains were destroyed much more easily than virulent ones. However, even among strains that were of maximum virulence for mice, there was a marked difference in bactericidal action. This may be due to variations in virulence other than that which can be measured in mice. Apparently, there was something inherent in the

[3] This was made by dissolving 5 grams toluidin blue in 100 cc alcohol, 500 cc distilled water, and 500 cc. of 5 percent phenol One part of this was diluted with 2 parts distilled water for use

individual strains of meningococci, which played an important role in their susceptibility to the defensive mechanism in the blood. Serological group did not seem to play a role of importance. Silverthorne (*10*) and his co-workers think response to bactericidal action may be a truer measure of virulence for man than pathogenicity for mice.

There was no actual correlation between the bactericidal activity of the blood and the response of the boy to an intracutaneous injection of meningococcus toxin. Negative skin reactions and high bactericidal activity occurred together in approximately the same number of instances as positive skin reactions and bactericidal activity. Both positive and negative skin reactions occurred an equal number of times with low bactericidal activity.

Phagocytic activity varied with the different bloods. Some strains of meningococci seemed more easily taken up by leucocytes than others, and this property did not seem to depend entirely upon virulence of the microorganism as measured in mice. Even at best, phagocytosis was slight, not more than 32 percent of the leucocytes engulfing meningococci in any case. In some samples of blood there was practically no evidence of phagocytic activity. There was no regular correlation between such phagocytosis as occurred and either bactericidal action or skin reaction.

Findings may be summarized as follows:

(1) At least one-half of all boys tested gave a positive skin reaction to meningococcus toxins.

(2) The blood of about one-half of the boys showed marked bactericidal activity for meningococci.

(3) Phagocytosis of meningococci by the leucocytes in blood from normal boys was never very pronounced and varied from 0 to 32 percent.

(4) There was no correlation between the three phenomena studied.

(5) Individual strains of meningococci varied greatly in their response to bactericidal and phagocytic activity.

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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

May 24–June 20, 1942

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended June 20, 1942, the number reported for the corresponding period in 1941, and the median number for the years 1937–41.

DISEASES ABOVE MEDIAN PREVALENCE

Influenza.—While the number of cases (2,809) of influenza reported for the 4 weeks ended June 20 was less than one-half of the number reported for the corresponding period in 1941, it was slightly higher than the 1937–41 median incidence for this period. A few more cases than might normally be expected were reported in the New England, West North Central, and Mountain regions, but in all other regions the incidence was below the preceding 5-year average incidence.

Measles.—The incidence of measles was less than 60 percent of the incidence recorded for the corresponding period in 1941, but the number of cases (approximately 63,000 cases) was about 1.3 times the average incidence for the years 1937–41. The disease was most prevalent in the West North Central, Mountain, and Pacific regions, with minor excesses over the seasonal expectancy in the New England and West North Central regions. During this period in 1941 this disease was most prevalent in the Middle Atlantic, East North Central, and South Atlantic regions; the current incidence in those regions was relatively low.

Meningococcus meningitis.—For the current period there were 288 cases of meningococcus meningitis reported, the number being about 1.9 times the incidence during the corresponding period in 1941, which figure (152 cases) also represents the 1937–41 average incidence for

this period. Each section of the country except the East South Central reported an excess of cases over the 1937–41 median figures. The current incidence, however, represented a 30-percent decrease from the number of cases reported during the preceding 4-week period and a further decline may be expected. Apparently the highest seasonal incidence was reached during the preceding 4-week period when 390 cases were reported, which was the highest incidence recorded for a 4-week period since 1937; during that year 690 cases were reported during the period corresponding to the one under consideration, and 772 cases were reported for the preceding 4-week period.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—For the 4 weeks ended June 20 there were 612 cases of diphtheria reported, as compared with 767 in the corresponding period in 1941 and a median of 1,022 cases in the years 1937–41. The situation was favorable in all sections of the country, each region reporting a lower incidence than might normally be expected.

Poliomyelitis.—The number of cases (97) of poliomyelitis was about 90 percent of the number reported in 1941 and only about 60 percent of the average seasonal incidence. The incidence was slightly above normal in the North Atlantic, West North Central, West South Central, and Mountain regions, about normal in the South Atlantic and East South Central regions, and relatively low in the East North Central and Pacific regions. The current figure represented an increase over the preceding 4-week period of about 35 percent, but there was nothing to indicate more than the normal increase of this disease that is expected at this season of the year.

Scarlet fever.—This disease still maintained an unusually low level, the number of cases (7,503) reported being the lowest on record for this period. The New England and East South Central regions reported slight excesses over the normal seasonal incidence but in all other regions the incidence was comparatively low.

Smallpox.—For the current period there were 105 cases of smallpox reported, as compared with 144, 243, and 1,057 for the corresponding period in 1941, 1940, and 1939, respectively. The number of cases was the lowest on record for this period. The most significant decreases were reported from the North Central and Pacific regions.

Typhoid and paratyphoid fever.—The number of cases of typhoid fever was also comparatively low, the number (457) being approximately 90 percent of the 1941 figure and less than 60 percent of the average seasonal incidence (804 cases). Very definite decreases were reported from all regions except the Middle Atlantic.

Whooping cough.—Approximately 15,000 cases of whooping cough were reported, as compared with 19,179 reported cases in 1941 and

an average of 16,058 cases in the years 1939–41. The disease was most prevalent in the North Atlantic and East North Central regions with a minor increase in the East South Central region; all other regions reported a decline in the number of cases.

MORTALITY, ALL CAUSES

The death rate from all causes in large cities was about normal. For the 4 weeks ended June 20 the average rate, based on data received from the Bureau of the Census, was 11.0 per 1,000 inhabitants (annual basis). The rate for the corresponding period in 1941 was 10.9, and the average rate for the years 1939–41 was 11.0.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period May 24–June 20, 1942, the number for the corresponding period in 1941, and the median number of cases reported for the corresponding period, 1937–41

Division	Current period	1941	5-year median	Current period	1941	5-year median	Current period	1941	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	612	767	1,022	2,809	5,649	2,685	62,904	111,273	48,249
New England	20	18	22	14	6	6	6,994	6,472	6,472
Middle Atlantic	87	140	208	27	23	36	9,869	37,913	18,292
East North Central	181	143	218	226	197	258	8,748	29,395	12,999
West North Central	38	62	62	34	43	63	5,225	4,496	3,225
South Atlantic	95	140	171	895	972	977	4,283	17,982	6,366
East South Central	41	61	71	140	167	167	756	4,771	1,429
West South Central	106	86	187	884	1,830	705	2,380	4,554	2,637
Mountain	41	71	61	376	329	221	5,010	2,992	2,671
Pacific	58	51	105	213	2,082	309	19,639	2,698	3,383
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	288	152	152	97	105	164	7,503	10,056	12,685
New England	29	14	10	6	3	2	974	905	905
Middle Atlantic	103	41	54	13	14	10	2,098	3,634	3,802
East North Central	11	21	21	9	12	12	2,241	3,041	3,904
West North Central	17	7	7	11	4	4	700	678	808
South Atlantic	56	25	25	15	27	16	438	552	518
East South Central	22	12	15	11	10	10	244	449	219
West South Central	20	19	14	16	10	10	169	153	172
Mountain	5	1	4	6	1	2	192	192	321
Pacific	25	12	12	10	24	24	447	452	654
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	105	144	839	457	513	804	15,027	19,798	[3] 16,058
New England	0	0	0	13	25	20	1,750	1,629	1,295
Middle Atlantic	0	0	0	62	90	59	4,015	3,011	3,257
East North Central	48	51	166	42	47	87	3,502	3,494	3,391
West North Central	9	43	331	29	31	40	475	1,379	878
South Atlantic	4	1	4	128	125	179	1,808	2,931	2,545
East South Central	8	20	23	42	47	87	771	789	705
West South Central	25	19	41	116	101	167	817	1,581	1,700
Mountain	7	4	39	6	15	26	495	1,400	1,012
Pacific	4	6	103	17	32	52	1,394	3,584	2,421

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.
[2] Mississippi excluded.
[3] Four-year (1938–41) average.

DEATHS DURING WEEK ENDED JUNE 27, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended June 27, 1942	Corresponding week 1941
Data from 87 large cities of the United States.		
Total deaths	7,734	8,583
Average for 3 prior years	7,809	
Total deaths, first 25 weeks of year	216,956	220,897
Deaths per 1,000 population, first 25 weeks of year, annual rate	12.2	12.4
Deaths under 1 year of age	489	548
Average for 3 prior years	511	
Deaths under 1 year of age, first 25 weeks of year	13,977	13,047
Data from industrial insurance companies		
Policies in force	64,967,453	64,419,021
Number of death claims	10,607	11,150
Death claims per 1,000 policies in force, annual rate	8.5	9.0
Death claims per 1,000 policies, first 25 weeks of year, annual rate	9.7	10.2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JULY 4, 1942

Summary

The number of reported cases of poliomyelitis increased from 41 to 55 during the current week. The current incidence, however, is not only below the 5-year (1937–41) median expectancy of 80, but is below the incidence for the corresponding week of any other year since 1938. For the same week in 1937, a total of 158 cases was reported. Currently, Arkansas reported 12 cases (3 last week), and Kentucky and Tennessee, 6 cases each (0 and 2, respectively, last week).

The number of cases of meningococcus meningitis declined from 112 to 53. Both the current incidence and the cumulative cases to date are above the figures for the corresponding periods of any other prior year since 1937.

The incidence of both smallpox and typhoid fever continues below that for any prior year.

Of the 9 common communicable diseases included in the following weekly table, the incidence of only measles and meningococcus meningitis was above the 5-year median expectancy for the first half of the current year. Of a total of 41 cases of anthrax reported during the first 6 months of this year, 25 cases occurred in Pennsylvania; of 3,199 cases of bacillary dysentery, 2,342 occurred in Texas; and of 1,825 cases of unspecified dysentery, 1,134 were reported in Virginia. During the same period, several cases of psittacosis of nonpsittacine origin were reported in New York, in which the disease was believed to have been contracted from pigeons

The death rate for the current week for 88 large cities in the United States is 10.7 per 1,000 population, as compared with 10.8 for the preceding week and with a 3-year (1939–41) average of 10.3.

Telegraphic morbidity reports from State health officers for the week ended July 4, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41
	July 4, 1942	July 5, 1941		July 4, 1942	July 5, 1941		July 4, 1942	July 5, 1941		July 4, 1942	July 5, 1941	
NEW ENG.												
Maine	0	0	0	-----	-----	-----	95	59	59	1	0	0
New Hampshire	0	0	0	-----	-----	-----	27	0	13	0	0	0
Vermont	0	0	0	-----	-----	-----	55	61	56	0	0	0
Massachusetts	0	0	0	-----	-----	-----	444	553	504	1	0	0
Rhode Island	0	0	0	-----	-----	-----	53	1	37	0	0	0
Connecticut	0	0	1	-----	2	1	141	240	45	2	0	0
MID. ATL.												
New York	14	8	10	[1] 3	[1] 8	[1] 3	611	985	894	9	4	4
New Jersey	2	1	4	5	-----	1	305	360	258	2	0	0
Pennsylvania	7	6	9	-----	-----	-----	230	1,294	927	3	2	4
E. NO. CEN.												
Ohio	7	3	20	1	5	7	90	651	540	1	1	2
Indiana	4	4	6	4	2	2	37	99	44	0	0	0
Illinois	19	7	20	3	1	5	70	236	182	0	1	1
Michigan [2]	3	0	5	-----	1	-----	237	406	230	1	0	0
Wisconsin	1	0	1	12	9	9	789	735	643	0	0	0
W. NO. CEN.												
Minnesota	4	1	1	-----	1	1	66	11	27	1	0	0
Iowa	1	1	2	-----	-----	-----	51	69	69	0	0	0
Missouri	1	1	1	-----	2	-----	31	150	18	1	0	0
North Dakota	0	0	0	1	13	-----	9	12	9	0	1	0
South Dakota	0	10	3	-----	-----	-----	2	5	3	0	0	0
Nebraska	1	0	1	2	-----	-----	32	16	11	1	0	1
Kansas	0	5	3	-----	15	1	35	60	60	1	1	0
SO. ATL.												
Delaware	0	0	0	-----	-----	-----	4	14	3	0	0	0
Maryland [2]	1	5	5	3	-----	-----	65	314	47	3	6	1
Dist. of Col.	0	1	2	-----	-----	-----	24	60	42	0	1	0
Virginia	3	4	4	42	69	14	59	311	115	2	1	1
West Virginia	2	3	4	-----	-----	6	27	203	30	0	2	1
North Carolina	4	3	4	1	-----	-----	66	237	174	0	0	0
South Carolina	1	1	2	37	74	83	34	192	18	0	1	0
Georgia	5	9	4	3	5	5	25	102	16	1	0	0
Florida	1	1	1	-----	10	-----	22	12	12	2	1	0
E. SO. CEN.												
Kentucky	5	0	1	1	-----	1	14	44	56	3	1	1
Tennessee	2	1	3	5	11	4	35	84	32	0	0	0
Alabama	6	2	3	3	-----	5	15	27	47	0	1	1
Mississippi [2]	2	7	4	-----	-----	-----	-----	-----	-----	0	0	0
W. SO. CEN.												
Arkansas	4	2	2	1	6	6	28	71	12	0	0	0
Louisiana	1	1	4	1	1	7	15	3	3	1	1	1
Oklahoma	0	3	4	11	11	10	39	74	30	0	0	0
Texas	1	10	11	135	289	76	99	145	145	6	2	1
MOUNTAIN												
Montana	4	3	1	-----	-----	-----	35	7	31	1	0	0
Idaho	0	1	0	-----	-----	1	7	7	7	0	0	0
Wyoming	0	0	0	56	-----	-----	22	6	6	0	1	0
Colorado	7	4	13	9	12	1	61	54	48	0	0	0
New Mexico	1	2	1	-----	1	1	11	48	23	0	0	0
Arizona	1	0	2	9	35	18	25	77	14	0	0	0
Utah [2]	0	1	0	1	2	-----	283	9	58	0	0	0
Nevada	0	0	-----	-----	-----	-----	23	3	-----	0	0	-----
PACIFIC												
Washington	4	3	1	3	-----	-----	729	15	63	0	0	0
Oregon	2	1	3	3	9	10	46	21	40	0	0	0
California	5	5	16	15	30	14	1,110	167	167	9	2	2
Total	126	120	245	370	619	358	6,333	8,310	6,225	52	30	34
26 weeks	6,304	6,399	10,227	78,126	485,393	157,354	450,664	801,933	334,515	2,019	1,210	1,210

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 4, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	July 4, 1942	July 5, 1941		July 4, 1942	July 5, 1941		July 4, 1942	July 5, 1941		July 4, 1942	July 5, 1941	
NEW ENG.												
Maine	0	0	0	7	3	9	0	0	0	0	2	2
New Hampshire	0	0	0	2	0	0	0	0	0	0	0	0
Vermont	0	0	0	1	0	3	0	0	0	0	0	0
Massachusetts	1	0	1	124	65	65	0	0	0	4	3	2
Rhode Island	0	0	0	5	2	5	0	0	0	1	0	0
Connecticut	0	0	0	11	12	20	0	0	0	1	0	0
MID. ATL.												
New York	1	3	2	108	140	170	0	0	0	2	5	6
New Jersey	0	1	0	37	32	57	0	0	0	2	2	2
Pennsylvania	1	4	1	85	76	100	0	0	0	10	7	13
E. NO. CEN.												
Ohio	1	1	1	86	113	116	5	0	1	16	7	8
Indiana	1	0	0	14	13	17	0	0	7	0	2	2
Illinois	4	5	2	62	65	133	2	4	14	2	14	9
Michigan [2]	3	0	1	85	98	126	0	2	0	0	6	8
Wisconsin	0	0	0	60	84	50	0	2	2	0	0	0
W. NO. CEN.												
Minnesota	0	2	0	22	15	27	0	2	3	2	0	0
Iowa	0	0	0	10	9	15	0	0	12	0	3	3
Missouri	1	0	0	12	0	16	1	0	10	5	7	7
North Dakota	1	0	0	3	4	4	0	0	0	1	0	0
South Dakota	0	0	0	3	4	5	0	0	4	1	0	0
Nebraska	0	0	0	4	7	8	0	0	0	0	0	0
Kansas	0	0	0	18	15	21	0	0	1	1	3	3
SO. ATL.												
Delaware	0	0	0	8	4	3	0	0	0	1	0	2
Maryland [2]	0	0	0	29	27	14	0	0	0	7	6	3
Dist. of Col.	0	0	0	1	3	4	0	0	0	0	0	0
Virginia	1	0	1	10	5	4	0	0	0	4	3	7
West Virginia	0	0	0	7	7	12	0	0	0	1	2	6
North Carolina	0	1	2	6	9	14	0	0	0	4	9	9
South Carolina	2	3	1	6	1	1	0	0	0	7	5	16
Georgia	1	19	4	7	3	9	1	0	0	16	20	25
Florida	1	6	1	1	1	1	0	0	0	6	2	2
E. SO. CEN.												
Kentucky	6	2	2	21	25	15	0	0	0	8	13	13
Tennessee	6	0	1	19	14	11	0	1	1	11	10	11
Alabama	1	22	2	7	5	7	0	0	0	2	5	7
Mississippi [2]	2	6	3	4	2	2	0	0	0	3	11	11
W. SO. CEN.												
Arkansas	12	0	0	2	0	2	0	0	0	8	8	13
Louisiana	2	0	0	4	1	5	1	0	0	12	9	19
Oklahoma	0	0	1	4	9	9	0	3	3	1	9	10
Texas	1	8	8	15	12	20	2	0	2	13	43	35
MOUNTAIN												
Montana	0	0	0	8	10	9	0	0	1	0	1	1
Idaho	0	0	0	0	1	2	1	0	0	1	0	2
Wyoming	0	0	0	12	0	6	1	0	0	0	1	0
Colorado	0	0	0	1	8	10	0	0	0	0	2	2
New Mexico	0	0	0	1	1	5	0	0	0	7	5	5
Arizona	3	0	0	2	1	2	0	2	2	1	1	2
Utah [2]	0	0	0	5	0	6	0	0	0	0	0	0
Nevada	0	0	-----	0	0	-----	0	0	-----	0	0	-----
PACIFIC												
Washington	0	0	0	8	7	11	0	0	1	0	0	1
Oregon	0	0	0	4	5	9	0	8	3	1	0	1
California	2	3	7	61	35	93	0	0	7	4	6	6
Total	54	86	80	1,012	903	1,277	14	19	109	166	232	305
26 weeks	609	757	784	84,293	85,044	110,798	568	1,093	7,370	2,378	2,654	3,791

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 4, 1942—Continued

Division and State	Whooping cough, Week ended— July 4, 1942	Whooping cough, Week ended— July 5, 1941	Week ended July 4, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	21	25	1	0	0	0	0	0	0	0	0
New Hampshire	0	1	0	0	0	0	0	0	0	0	0
Vermont	38	0	0	0	0	0	0	0	0	0	0
Massachusetts	180	101	0	0	0	0	1	0	0	0	0
Rhode Island	43	18	0	0	0	0	0	0	0	0	0
Connecticut	58	42	0	0	1	0	0	0	0	0	0
MID. ATL.											
New York	379	226	0	2	32	0	3	0	0	0	0
New Jersey	246	53	0	2	0	0	0	0	0	0	0
Pennsylvania	237	314	0	0	0	0	0	0	0	0	0
E. NO. CEN.											
Ohio	177	346	0	0	0	0	0	0	0	0	0
Indiana	38	9	0	0	0	0	0	0	0	0	0
Illinois	334	75	0	0	1	0	0	0	0	2	0
Michigan [2]	122	223	0	0	5	0	0	0	0	0	0
Wisconsin	248	103	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	34	63	0	0	0	0	1	0	0	0	0
Iowa	27	47	0	0	0	0	1	0	[illegible]	0	0
Missouri	11	0	0	0	0	0	0	0	0	2	0
North Dakota	0	28	0	0	0	0	0	0	0	0	0
South Dakota	0	7	0	0	0	0	0	0	1	0	0
Nebraska	7	17	0	0	0	0	0	0	0	0	0
Kansas	54	149	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	1	2	0	0	0	0	0	0	1	0	0
Maryland [2]	55	84	0	0	0	1	0	0	4	0	0
District of Columbia	22	9	0	0	0	0	0	0	0	0	0
Virginia	46	112	0	0	0	262	0	0	3	0	0
West Virginia	8	36	0	0	0	0	0	0	0	0	0
North Carolina	108	185	0	0	0	0	0	0	1	0	1
South Carolina	46	91	0	0	0	0	0	0	0	0	3
Georgia	45	15	0	0	23	0	0	0	0	0	16
Florida	4	8	0	0	0	0	0	0	1	1	2
E. SO. CEN.											
Kentucky	46	45	0	0	2	0	0	0	0	1	0
Tennessee	71	43	0	0	0	14	0	0	0	2	1
Alabama	31	14	0	0	0	0	0	0	0	0	6
Mississippi [2]	------	------	0	0	0	0	0	0	0	2	1
W. SO. CEN.											
Arkansas	19	22	0	3	63	0	0	0	0	3	0
Louisiana	0	12	1	0	0	0	0	0	0	0	0
Oklahoma	14	25	0	0	0	0	0	0	0	0	0
Texas	137	250	0	16	219	0	0	0	0	0	21
MOUNTAIN											
Montana	13	14	0	0	0	0	0	0	1	0	0
Idaho	3	10	0	0	0	0	0	0	0	0	0
Wyoming	7	0	0	0	0	0	0	0	0	1	0
Colorado	24	96	0	0	0	0	0	0	0	1	0
New Mexico	17	42	0	0	1	0	0	0	0	0	0
Arizona	23	31	0	0	0	31	0	0	0	0	0
Utah [2]	31	28	0	0	0	0	0	0	1	0	0
Nevada	4	12	0	0	0	0	0	0	2	0	0
PACIFIC											
Washington	62	52	0	0	1	0	0	0	0	0	0
Oregon	20	26	0	0	0	0	0	0	1	0	0
California	126	318	0	2	4	0	0	0	0	0	1
Total	3,237	3,431	2	25	352	308	6	0	16	15	52
26 weeks	98,514	119,860	------	------	------	------	------	------	------	------	------

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 20, 1942

This table lists the reports from 88 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	6	0	1	0	2	0	3	0	0	8
Baltimore, Md	2	0	1	0	52	2	4	0	8	0	0	54
Barre, Vt	0	0	-----	0	2	0	0	0	0	0	0	8
Billings, Mont	0	0	-----	0	12	0	0	0	0	0	0	2
Birmingham, Ala	0	0	2	2	0	0	4	0	1	0	0	1
Boise, Idaho	0	0	-----	0	0	0	0	0	0	0	0	0
Boston, Mass	0	0	-----	0	210	0	8	0	32	0	0	50
Bridgeport, Conn	0	0	-----	0	5	0	0	0	1	0	0	1
Brunswick, Ga	0	0	-----	0	0	0	1	0	0	0	0	0
Buffalo, N. Y	0	0	-----	0	12	1	2	0	2	0	0	1
Camden, N. J	0	0	-----	0	2	0	0	0	5	0	0	2
Charleston, S. C	2	0	2	0	8	0	3	0	0	0	1	1
Charleston, W. Va	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Chicago, Ill	19	0	3	0	23	1	16	0	42	1	3	130
Cincinnati, Ohio	0	0	1	0	3	0	2	0	12	0	0	8
Cleveland, Ohio	1	0	10	0	4	1	5	0	25	0	0	32
Columbus, Ohio	1	0	-----	0	20	0	1	0	9	0	1	11
Concord, N. H	0	0	-----	0	2	0	0	0	0	0	0	0
Cumberland, Md	0	0	-----	0	0	0	0	0	0	0	0	0
Dallas, Tex	1	0	-----	0	3	0	0	0	4	0	0	4
Denver, Colo	11	0	4	1	64	0	2	0	2	0	0	8
Detroit, Mich	3	0	1	1	32	0	12	0	65	0	0	80
Duluth, Minn	0	0	-----	0	5	0	0	2	2	0	0	3
Fall River, Mass	1	0	-----	0	19	0	0	0	11	0	0	4
Fargo, N. Dak	1	0	-----	0	2	0	0	0	0	0	0	0
Flint, Mich	0	0	-----	0	1	0	1	0	4	0	0	4
Fort Wayne, Ind	0	0	-----	0	0	0	2	0	1	0	0	3
Frederick, Md	0	0	-----	0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	-----	0	1	0	1	0	0	0	0	7
Grand Rapids, Mich	0	1	-----	0	1	0	1	0	0	0	0	4
Great Falls, Mont	0	0	-----	0	10	0	1	0	0	0	0	1
Hartford, Conn	0	0	-----	0	41	0	2	0	2	0	0	13
Helena, Mont	0	0	-----	0	2	0	0	1	0	0	0	0
Houston, Tex	0	0	-----	0	9	0	5	0	1	0	2	1
Indianapolis, Ind	0	0	-----	1	32	0	4	0	5	0	0	11
Kansas City, Mo	0	0	-----	0	20	0	2	0	9	0	0	0
Kenosha, Wis	0	0	-----	0	10	0	0	0	0	0	0	12
Little Rock, Ark	0	0	-----	0	0	0	0	0	0	0	0	2
Los Angeles, Calif	3	0	6	0	219	1	6	0	9	0	0	21
Lynchburg, Va	1	0	-----	0	0	0	0	0	0	0	0	13
Memphis, Tenn	0	0	-----	0	18	0	4	0	0	1	0	11
Milwaukee, Wis	0	0	-----	0	463	0	3	0	8	0	0	26
Minneapolis, Minn	0	0	-----	0	59	0	1	0	5	1	0	3
Missoula, Mont	0	0	-----	0	1	1	1	0	0	0	0	0
Mobile, Ala	0	0	-----	0	0	0	1	0	0	0	3	0
Nashville, Tenn	0	0	-----	0	4	0	1	0	0	0	0	3
Newark, N. J	0	0	2	0	122	3	4	0	7	0	0	44
New Haven, Conn	0	0	-----	0	22	0	0	0	3	0	0	7
New Orleans, La	2	0	2	2	17	0	10	1	1	0	2	5
New York, N. Y	14	0	-----	0	102	10	39	1	74	0	0	186
Omaha, Nebr	0	0	-----	0	20	0	1	0	1	0	0	0
Philadelphia, Pa	1	0	3	0	31	3	9	0	66	0	0	86
Pittsburgh, Pa	1	0	-----	0	11	0	1	0	2	0	0	13
Portland, Maine	0	0	-----	0	32	0	2	0	5	0	0	2
Providence, R. I	3	0	-----	0	102	1	1	0	2	0	1	17
Pueblo, Colo	0	0	-----	0	1	0	0	0	2	0	0	2
Racine, Wis	0	0	-----	0	92	0	0	0	6	0	0	12
Raleigh, N. C	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Reading, Pa	0	0	-----	1	0	0	0	0	0	0	1	8
Richmond, Va	0	0	-----	0	6	0	1	0	1	0	0	4

City reports for week ended June 20, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Roanoke, Va	0	0	-----	0	0	0	0	0	0	0	0	0
Rochester, N. Y	0	0	-----	0	19	0	0	0	1	0	1	12
Sacramento, Calif	0	0	-----	0	9	0	0	0	3	0	0	6
Saint Joseph, Mo	0	0	-----	0	0	0	1	0	1	0	0	1
Saint Louis, Mo	0	0	-----	0	10	2	6	1	5	0	2	4
Saint Paul, Minn	0	0	-----	0	48	0	2	0	1	0	0	8
Salt Lake City, Utah	0	0	-----	0	317	0	4	2	0	0	0	5
San Antonio, Tex	0	0	-----	0	7	0	5	0	0	0	0	2
San Francisco, Calif	0	0	1	0	973	0	5	0	11	0	0	13
Savannah, Ga	0	0	-----	0	3	0	0	0	0	0	0	2
Seattle, Wash	1	0	-----	0	298	0	4	0	3	0	0	14
Shreveport, La	0	0	-----	0	0	0	2	1	0	0	0	0
South Bend, Ind	0	0	-----	0	1	0	0	0	0	0	0	0
Spokane, Wash	1	0	-----	0	105	0	0	0	3	0	0	1
Springfield, Ill	0	0	-----	0	6	0	1	0	0	0	0	0
Springfield, Mass	0	0	-----	0	52	0	2	0	8	0	0	5
Superior, Wis	0	0	-----	0	1	0	0	0	0	0	0	1
Syracuse, N. Y	0	0	-----	0	453	0	3	0	3	0	2	38
Tacoma, Wash	0	0	-----	0	30	0	2	0	3	0	0	0
Tampa, Fla	0	0	-----	0	10	0	1	0	0	0	0	0
Terre Haute, Ind	0	0	-----	0	2	0	2	0	1	0	0	0
Topeka, Kans	0	0	-----	0	1	0	0	0	1	0	0	1
Trenton, N. J	0	0	-----	0	1	0	1	0	6	0	0	1
Washington, D. C	1	0	-----	0	47	0	7	0	2	0	1	17
Wheeling, W. Va	0	0	-----	0	4	0	1	0	0	0	0	1
Wichita, Kans	0	0	-----	0	15	0	2	1	2	0	0	4
Wilmington, Del	0	0	-----	0	3	0	2	0	0	0	0	1
Wilmington, N. C	0	0	-----	0	0	0	0	0	0	0	0	21
Winston-Salem, N. C	0	0	-----	0	0	0	0	0	1	0	0	1
Worcester, Mass	0	0		0	0	0	6	0	13	0	1	83

(11862)

Anthrax.—Cases: Camden, 1; Philadelphia, 1; Shreveport, 1.
Dysentery, bacillary.—Cases. Baltimore, 1; Los Angeles, 4, New Orleans, 1; St. Louis, 2.
Rocky Mountain spotted fever.—Cases: Washington, 1.
Tularemia.—Cases: New Orleans, 1.
Typhus fever.—Cases. Atlanta, 2; Charleston, S. C., 1; New Orleans, 1; Savannah, 2; Terre Haute, 1.

Rates (annual basis) per 100,000 population, for the group of 88 cities in the preceding table (estimated population, 1942, 34,015,555)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended June 20, 1942	10 73	6.74	1.23	666.05	34.49	77 57	0.46	3.22	179.66
Average for week, 1937-41	13.17	5.27	2.48	[1] 544.65	46.63	146.54	1.55	4.80	188.21

[1] Median.

PLAGUE INFECTION IN CALIFORNIA AND OREGON

Plague infection has been reported in California and Oregon as follows:

CALIFORNIA

Lassen County: April 15, in fleas from ground squirrels, *C. beecheyi*, as follows: in a pool of 44 fleas from 2 ground squirrels collected approximately 9½ miles northwest of Doyle, a pool of 133 fleas from 3 ground squirrels taken 6 miles northwest of Milford, a third pool of 47 fleas from 3 ground squirrels taken at Doyle, and a pool of 200 fleas from 12 ground squirrels taken 4 miles northwest of Doyle; April 16, in a pool of 18 fleas from 1 ground squirrel, *C. beldingi*, taken 8 miles northwest of Doyle; April 20, in a pool of 125 fleas from 12 ground squirrels (*C. beecheyi*) taken 1½ miles south of Milford; April 21, in a pool of 23 fleas from 1 ground squirrel of same species, taken 3 miles northwest of Doyle; June 3, in tissue from 1 ground squirrel, *C. beldingi*, taken 17½ miles south and 28 miles east of Susanville.

Monterey County: June 3, in a pool of 186 fleas from 17 ground squirrels (*C. beecheyi*) taken 12 miles southwest of Salinas (Fort Ord).

San Luis Obispo County: May 27, in organs from a gopher taken 12 miles east and 13 miles south of Arroyo Grande (Alamo Creek); June 3 and 4, respectively, in organs from 13 and from 6 ground squirrels (*C. beecheyi*) collected 2½ miles north and 8 miles east of Santa Maria; June 10, in organs from a ground squirrel of the same species, 8 weeks old, taken 13 miles south of Arroyo Grande.

Siskiyou County: In fleas from ground squirrels (*C. douglasii*), as follows: May 27, in a pool of 24 fleas from 5 ground squirrels taken 8 miles east and 2 miles south of Montague, and, May 29, in a pool of 31 fleas from 2 ground squirrels, taken 1 mile farther south; May 28, in a pool of 88 fleas from 4 ground squirrels taken 5 miles east of Montague, and in a pool of 43 fleas from 6 ground squirrels taken 4 miles east and 1 mile north of Yreka.

OREGON

Grant County: May 25, in tissue from 1 ground squirrel (*C. oregonus*) taken 4 miles southwest of Mt. Vernon; May 27, in a pool of 41 fleas and 60 lice from 90 ground squirrels, same species, taken 3 miles south of Beech Creek; May 31, in a pool of 197 fleas and 41 lice from 7 marmots (*M. flaviventris*), taken on Laycock Road, 2 to 5 miles south of Mt. Vernon.

Malheur County: June 6, in a pool of 79 fleas from 5 marmots (*M. flaviventris*) taken 1 to 5 miles east of Jordan Valley; June 8, in a pool of 48 fleas from 6 marmots (same species) taken on Arock Road, 2 to 6 miles south of Danner; June 10, in a pool of 7 fleas from 27 ground squirrels (*C. oregonus*), collected 1 to 5 miles west of Jordan Valley, Highway No. 95.

TERRITORIES AND POSSESSIONS

Virgin Islands of the United States

Notifiable diseases—January–March 1942.—During the months of January, February, and March 1942, cases of certain notifiable diseases were reported in the Virgin Islands as follows:

Disease	January	February	March
Chickenpox	2	6	6
Dengue		6	
Dysentary (bacillary)			2
Filariasis	6	5	6
German measles	2	4	30
Gonorrhea	26	23	38
Hookworm disease	1	2	1
Lymphogranuloma venereum		1	
Malaria	4	1	2
Mumps	3	125	60
Pellagra		1	
Pneumonia	1		
Syphilis	33	22	43
Tetanus		1	
Tuberculosis	1	2	3

FOREIGN REPORTS

AZORES

St. Michel—Cerebrospinal meningitis.—During the period March 1 to May 16, 1942, 425 cases of cerebrospinal meningitis with 71 deaths were reported in St. Michel, Azores. The numbers of cases and deaths reported by weeks are as follows:

Week ended (1942)—	Cases	Deaths	Week ended (1942)—	Cases	Deaths
March 7	29	8	April 18	42	8
March 14	26	8	April 25	53	11
March 21	43	6	May 2	43	6
March 28	39	3	May 9	52	7
April 4	34	6	May 16	19	3
April 11	45	5			

CANADA

Provinces—Communicable diseases—Week ended June 6, 1942.—During the week ended June 6, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		1	4	1	5				1	12
Chickenpox		6	2	178	320	38	18	67	62	691
Diphtheria		8	5	24	1	2	1		2	43
Dysentery	4			7	1					12
German measles		1		12	46	18	10	36	18	141
Influenza	6	6					3		5	20
Lethargic encephalitis						1				1
Measles		2	6	348	275	95	25	6	37	794
Mumps	3	23	8	141	433	36	112	42	218	1,016
Pneumonia	4	6			8	3			1	22
Poliomyelitis			2			1	1			4
Scarlet fever		10	24	98	183	31	24	77	17	464
Tuberculosis	4	6	14	92	39		1	1		157
Typhoid and paratyphoid fever			1	8	1	1	1		1	13
Undulant fever				1	1					2
Whooping cough		2		236	45	7	6	13	19	328
Other communicable diseases	2	7		5	238	31		1	14	298

CUBA

Provinces—Notifiable diseases—4 weeks ended May 23, 1942.—During the 4 weeks ended May 23, 1942, cases of certain notifiable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana[1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1		6	10	1	10	28
Chickenpox				1	5	1	7
Diphtheria	1	21	3	3	1	2	31
Leprosy				1		2	3
Malaria	81	16		5	2	310	414
Measles		29		1	1	3	34
Poliomyelitis	1	4		2		3	10
Rabies		1					1
Tuberculosis	13	36	20	25	21	58	173
Typhoid fever	8	78	6	67	21	30	210
Undulant fever				1			1
Yaws						1	1

[1] Includes the city of Habana

FINLAND

Communicable diseases—March 1942.—During the month of March 1942, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	129	Paratyphoid fever	75
Dysentery	7	Scarlet fever	497
Influenza	1,914	Typhoid fever	74

JAMAICA

Notifiable diseases—4 weeks ended May 9, 1942.—During the 4 weeks ended May 9, 1942, cases of certain notifiable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	18	11	Puerperal fever		1
Diphtheria		2	Tuberculosis	32	62
Dysentery		1	Typhoid fever	6	23
Leprosy		3	Typhus fever	6	2
Poliomyelitis		1			

NOTE.—No report was received for the week ended May 2.

MALTA

Notifiable diseases—March 1942.—During the month of March 1942, certain notifiable diseases were reported in Malta including the island of Gozo as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cancer		13	Pneumonia	154	32
Cerebrospinal meningitis	5		Scarlet fever	2	
Diabetes mellitus		28	Trachoma	8	
Diphtheria	14	3	Tuberculosis (pulmonary)	34	23
Gastroenteritis		34	Typhoid fever	8	1
Influenza	133		Undulant fever	17	2
Measles	2		Whooping cough	40	3

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Egypt—Port Said.—During the period June 11–17, 1942, one case of bubonic plague was reported in Port Said, Egypt.

Peru—Lima.—According to information dated June 12, 1942, an outbreak of plague has been reported in Lima, Peru, where, from the latter part of April to June 12, 1942, 13 cases with 4 deaths have occurred.

Typhus Fever

Hungary.—For the week ended June 13, 1942, 22 cases of typhus fever were reported in Hungary.

Iraq.—During the week ended May 23, 1942 18 cases of typhus fever were reported in Iraq.

Irish Free State—Mayo County—Westport.—During the week ended May 30, 1942, 1 case of typhus fever was reported in Westport, Mayo County, Irish Free State.

Morocco.—During the week ended June 13, 1942, 832 cases of typhus fever were reported in Morocco.

Rumania.—For the week ended June 20, 1942, 52 cases of typhus fever were reported in Rumania.

Spain.—For the week ended May 30, 1942, 20 cases of typhus fever were reported in Spain.

Tunisia.—During the period June 1–10, 1942, 725 cases of typhus fever were reported in Tunisia.

* * * * * * *

COURT DECISION ON PUBLIC HEALTH

State superintendent of public health—amount of annual salary—applicable statutes construed.—(Arizona Supreme Court; *Manning* v. *Frohmiller, State Auditor*, 120 P.2d 416; decided Dec. 29, 1941.) The Arizona statutes provided that the State superintendent of public

health should receive a salary, to be fixed by the State board of health within the limits of funds available therefor, of not less than $4,800 per annum. They also provided that the public health fund should consist of appropriations and of all receipts from any other source for the use of the State department of public health and that the salaries and expenses of the department should be paid from such fund. An appropriation law appropriated the sum of $3,600 for each of 2 fiscal years for the salary of the superintendent. The board of health, acting under the express authority from the legislature, fixed the salary of the superintendent at $5,100 per year.

In a mandamus proceeding the petitioner sought to compel the State auditor to approve warrants for his salary as superintendent in the full amount of the salary fixed by the board of health. The auditor's position was that she was limited in her payment of the petitioner's salary to the amount specifically appropriated for that purpose, namely, $3,600 per year. Pointing out that the statute did not limit the salary of the superintendent as fixed by the board to the amount appropriated by the legislature for that purpose but to the "funds available therefor," that the public health fund consisted not only of appropriations by the legislature but also of any receipts from other sources, and that the salaries of the department were to be paid from such fund, the Supreme Court of Arizona said that it thought that the reasonable construction of the law was that the petitioner was entitled to have his salary warrants approved for the full amount of $5,100 per year since there was in the public health fund an amount sufficient to pay the salary as fixed by the board of health.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

THE PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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Public Health Reports

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STUDIES OF SEWAGE PURIFICATION

XVI. DETERMINATION OF DISSOLVED OXYGEN IN ACTIVATED SLUDGE-SEWAGE MIXTURES [1]

By C. C. Ruchhoft, *Principal Chemist*, and O. R. Placak, *Assistant Chemist*
United States Public Health Service

The importance of dissolved oxygen in activated sludge aeration liquors to the successful operation of the process is well known. Only

[1] From the Division of Public Health Methods, National Institute of Health. Preceding papers in this series are

Theriault, E. J., and McNamee, P. D : Studies of sewage purification. I. Apparatus for thedetermination of dissolved oxygen in sludge-sewage mixtures. Pub. Health Rep., 50: 480 (1935). Reprint 1680

Butterfield, C. T Studies of sewage purification. II. A zooglea-forming bacterium isolated from activated sludge. Pub. Health Rep. 50: 671 (1935). Reprint 1686.

Theriault, E. J . Studies of sewage purification. III. The clarification of sewage. A review. Sewage Works J., 7 377 (1935). Pub. Health Rep., 50: 1581 (1935). Reprint 1715

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within the past 10 years, however, have attempts been made to use dissolved oxygen data as criteria of plant operation. The desire for information concerning the dissolved oxygen content of activated sludge mixed liquors was expressed by Theriault and McNamee (*1*) in studying bulking problems in 1934. Since then Klassen (*2*), Anderson (*3*), Heukelekian (*4*), and Poindexter (*5*) have all pointed out the importance of this determination for purposes of activated sludge plant control. While the use of the dissolved oxygen determination on mixed aeration liquors is becoming widespread in activated sludge plant operation, no entirely satisfactory method for its determination has been proposed or developed.

Three primary characteristics of activated sludge make it difficult to determine dissolved oxygen in aeration mixtures. The first and most important is the presence of the zoogleal sludge floc with its adsorbed organic matter. This floc, regardless of its condition, contains 60 to 90 percent of organic matter and interferes with the ordinary Winkler or other similar chemical determination of dissolved oxygen. The second characteristic is the biochemical oxidizing capacity and oxygen demand of the sludge floc, which may use 100 mg. or more of O_2 per liter per hour. The third characteristic which introduces difficulty is the very frequent presence of nitrites in the mixed liquor, which interferes with the ordinary Winkler determination. The ideal method for the determination of dissolved oxygen in sludge liquors, therefore, is one which removes the sludge floc, stops biochemical and chemical oxidation or interference, destroys nitrites, and is simple and easy to use. Kuehler (*6*) designed an apparatus for separating the sludge and supernatant, which overcame only the first difficulty, but bulking sludge could hardly be separated quickly enough in the apparatus. However, Kuehler did recommend the use of the azide procedure of Alsterberg to destroy nitrites.

Konstantinowa (*7*) proposed the use of mercuric chloride to stop biochemical oxidation. After the sludge settled, the supernatant was siphoned off and its dissolved oxygen content was determined, using the Rideal-Stewart modification to oxidize nitrites and prevent their interference. Theoretically this procedure should be satisfactory, but practical difficulties were observed by Goldthorpe (*8*) who found that mercuric chloride did not completely arrest absorption of oxygen and tended to disperse the sludge floc and prevent settlement. Watson (*9*) also used mercuric chloride to stop oxidation and followed this by precipitation of the mercury salt and coagulation of the floc with sodium hydroxide. In view of the increase in rate of chemical oxidation at high pH this practice seems undesirable. The use of mercuric chloride seems unsatisfactory and leads to other difficulties as found by both investigators and consequently will not be further reviewed here.

Theriault and McNamee (*1*) overcame all difficulties in determining dissolved oxygen in sludge mixtures by developing an apparatus with which the gases in solution were extracted from a sludge sample. The oxygen in the extracted gas was then determined by the Winkler method in a special apparatus. While this procedure is satisfactory for research, it requires special apparatus, decidedly limits the number of samples that can be examined, and has not been adopted in practice.

In their early paper on oxygen demands of activated sludge, Kessler and Nichols (*10*) used copper sulfate for the prevention of biochemical oxidation. They ascribe the first use of the reagent for this purpose to Palmer and Beck.[2] Kessler and Nichols used the short Winkler procedure suggested by Theriault (*12*) to shorten the period of alkalinization of the supernatant in the absence of iron and nitrites. However, the effectiveness of copper sulfate in preventing biochemical oxidation has apparently not been thoroughly studied. Goldthorpe, who also adopted copper sulfate as a more satisfactory respiratory inhibitor than mercuric chloride for use with activated sludge, notes that this salt in the concentrations used did not completely arrest oxygen absorption.

Recently it was shown (*12*) that the sulfuric acid-sodium azide treatment of river and sewage plant effluent samples stopped biochemical oxidation and enabled a delayed dissolved oxygen determination. The use of sodium azide to destroy nitrites previous to and in the Winkler determination has also been carefully studied (*12, 13, 14*) and found satisfactory for general biochemical oxygen demand work, where ferrous iron is not present. It has also been found (*15*) that sulfamic acid is effective in destroying nitrites previous to the dissolved oxygen determination in stream pollution and sewage treatment studies. In consideration of these developments a reinvestigation of procedures for determining dissolved oxygen in activated sludge mixtures has been made.

EXPERIMENTAL

In the first series of experiments, four duplicate samples were collected in liter bottles from our experimental sludge plant aeration chamber. The first sample was untreated and was immediately centrifuged in special ground glass stoppered bottles, the dissolved oxygen in the supernatant being determined by the azide modification. The other three samples were collected in bottles to which had been added sulfuric acid, a mixture of sulfuric acid and sodium azide, and copper sulfate solutions, respectively. The dissolved oxygen in the supernatant from each sample was determined by the azide modification. The results obtained with three bulking sludges using the above procedure are compared in table 1. These data show that, whereas a

[2] John P Palmer and A. J. Beck. The Sanitary District of Chicago (1934). Unpublished data.

mean dissolved oxygen of 5 94 p. p. m. was found in the untreated sample, this rapidly disappeared. The sulfuric acid and sulfuric acid-azide treated samples showed a mean initial dissolved oxygen of 6 38 p. p m and this value was slowly reduced in the sulfuric acid treated sample and even more slowly reduced in the sulfuric acid-azide treated sample. The copper sulfate treated sample had a mean initial dissolved oxygen of 7.55 p p. m., or over 1 p. p. m. higher than the other treated samples. The dissolved oxygen was apparently lost more rapidly than in the sulfuric acid or sulfuric acid-azide treated samples. These experiments indicate that the copper sulfate treatment of sludge is inferior in arresting oxygen absorption but gives higher immediate values.[3]

TABLE 1.—*Comparison of dissolved oxygen found by various procedures in activated sludge mixed liquors*

[Dissolved oxygen values are the mean of 2 determinations]

Sludge No	Temperature °C	NO_3, parts per million	Suspended solids	Sludge index	Time in minutes after collection and treatment: Initial A	Initial B	Initial C	Initial D	0 A	0 B	0 C	0 D	60 A	60 B	60 C	60 D
1	13	2 0	2598	370	5 40	6 20	6 20	7 36	0 08	5 48	5 73	5 42	0 09	4 74	5 32	4 22
2	8	2 0	2092	468	8 18	8 15	8 15	9 30	1 57	7 72	7 80	8 38	00	7 29	7 52	7 66
3	23		1222	704	4 23	4 78	4 78	5 96	1 00	4 41	4 69	4 50	00	4 25	4 63	4 23
Mean					5 94	6 38	6 38	7 55	55	5 87	6 07	6 10	03	5 42	5 82	5 37

[1] 20 minutes after collection

A Untreated sample—dissolved oxygen by the azide modification
B Collection bottle dosed with H_2SO_4, dissolved oxygen by azide modification
C Collection bottle dosed with H_2SO_4 and NaN_3, dissolved oxygen by azide modification
D. Collection bottle dosed with $CuSO_4$, dissolved oxygen by Rideal Stewart modification

In the second series of experiments, eight different treatments were compared to the copper sulfate treatment for determining the dissolved oxygen content immediately after collection. In these experiments 12 gallons of activated sludge mixture were aerated in a conical bottomed aeration vessel in the laboratory. Two parallel siphons were arranged in this vessel so that sludge samples could be siphoned into two bottles simultaneously to insure duplicate samples. The reagent or reagents to be studied were put into one 1,200 ml. glass stoppered bottle and 10 ml. of a 10 percent copper sulfate solution into a similar bottle. The sludge samples were then siphoned into both bottles simultaneously until the bottles were completely filled. The stoppers were inserted, the contents mixed for 5 to 10 seconds, and after settling

[3] It may be supposed that the higher dissolved oxygen values obtained with copper sulfate treatment are due to the reduction of the copper by the potassium iodide in acid solution Investigation showed that the concentration of potassium iodide used in the dissolved oxygen determination was not sufficient to induce this reaction If three or four times the usual amount of potassium iodide is used during the dissolved oxygen determination, appreciable amounts of iodine (equivalent to 0 1-0 2 p p m of oxygen) will be released from the iodide by the copper

for 5 to 10 minutes the supernatant was siphoned into 300 ml. dissolved oxygen bottles. The dissolved oxygen in all samples was then determined by the short Winkler technique with sodium azide in the alkaline iodide (*11*, *12*) solution.

The following reagents were employed for floc coagulation and arresting biochemical oxidation in the various tests:

(1) Ten percent solution of copper sulfate.
(2) Concentrated sulfuric acid.
(3) Two percent sodium azide solution.
(4) Standard Methods manganous sulfate solution containing 4 percent sulfamic acid.
(5) Glacial acetic acid.
(6) Dilute acetic acid (1 to 4 dilution of glacial acid).
(7) Two percent solution of sulfamic acid.

These reagents were used in the amounts and combinations shown in table 2, and each combination was used in one bottle of a pair, the other bottle containing only 10 ml. of copper sulfate. The pair of bottles in each experiment was filled with sludge samples simultaneously as described. The results obtained are shown in table 2.

TABLE 2.—*Comparison of treatment procedures for coagulation and prevention of oxygen absorption of activated sludge in the determination of dissolved oxygen*

Experiment No.	Treatment used to compare with $CuSO_4$	pH resulting from sludge treatment		Dissolved oxygen			
				Found in sample, parts per million		Deviations	
	Reagents added to 1,200 ml. bottle	Treatment described at left	$CuSO_4$ only	Treatment described	$CuSO_4$ only	Parts per million	Percent
1	10 ml. $CuSO_4$ solution+2.8 ml. concentrated H_2SO_4	1 6	4.8	6.28	6.29	−0 01	0.16
2	2.8 ml. concentrated H_2SO_4+5 ml. NaN_3 solution	1 6	4.7	5.62	6.32	− 70	11.07
3	10 ml $MnSO_4$—sulfamic acid+5 ml. NaN_3 solution	2.9	4 6	6.80	7.00	−.20	2.85
4	3 ml glacial acetic+5 ml. NaN_3 solution	3 4	4 4	7 26	7 34	− 08	1.09
5	2 ml. glacial acetic+5 ml NaN_3 solution	3.5	4 4	7.16	7.11	+ 04	.53
6	4 ml. sulfamic acid solution+5 ml. NaN_3 solution	4 8	4 8	2.95	2.99	− 04	1.34
7	8 ml. sulfamic acid solution+5 ml. NaN_3 solution	4.4	4.8	4 92	5.00	−.08	1.60
8	1 ml. dilute acetic+5 ml. NaN_3 solution	4.4	4 6	5.25	5.27	− 02	.37

These data show that the copper sulfate treatment of these sludges reduced the pH to within the range of 4.4 to 4.8 in all experiments. Using other reagents the sludge pH was adjusted to values between 1.6 and 4.8 in the different experiments. Experiment 2 (table 2) which was repeated several times, indicated that when the sludge is treated with sulfuric acid and azide to lower its pH to about 1.6, a lower percentage recovery of the dissolved oxygen results than with

copper sulfate treatment. However, when the pH is lowered to 1.6 with sulfuric acid in the presence of the copper salt as in experiment 1, no detrimental effect upon the dissolved oxygen recovery was observed. In experiment 3 the pH was lowered to 2.9 with a solution of manganous sulfate containing 4 percent sulfamic acid. In this case the deviation from the dissolved oxygen result obtained with copper sulfate alone was only 2.85 percent. In the remaining experiments the pH was adjusted between 3.4 and 4.8 with various treatments and the oxygen recovery deviation was always less than 2 percent. This series of experiments indicated that it was possible to treat and coagulate activated sludge with a number of reagents and obtain dissolved oxygen results practically identical with those obtained with copper sulfate treatment. If the treatment is such that the pH is reduced below about 3.0, oxygen is apt to be lost; while if the pH is 4.8 or above with these reagents, the coagulation is poor so that the time required for settling may be prolonged, especially with a bulking sludge.

The effectiveness of various preliminary treatments in stopping biochemical oxidation was next studied in a series of experiments. The activated sludge was aerated in the conical bottomed vessel and sludge samples were withdrawn over a 4-hour period to study five treatment methods. On the succeeding day the aeration vessel was refilled and samples were withdrawn to complete the experiment with six additional treatment methods. All these experiments were, therefore, conducted using two batches of sludge. While there was, no doubt, some difference in the oxygen demand of the sludge mixture during the course of these experiments, the range of this variation is not considered sufficient to impair the results obtained.

Each sludge treatment using one or a combination of reagents was studied as follows: The dose of reagents to be studied was introduced into each of eight 500 ml. glass stoppered bottles. These bottles were then filled as rapidly as possible, two being filled at a time with the twin siphons. After mixing the contents of all bottles the first and last bottle filled were taken for the initial dissolved oxygen (D. O.) determination. As in the previous series the sludge was allowed to settle for 5 minutes, after which the supernatant was siphoned into D. O bottles. The short Winkler technique employing the alkaline iodide reagent containing sodium azide was used on all dissolved oxygen determinations. After final acidification, however, each dissolved oxygen sample was allowed to stand 2 minutes before titration. The other 6 bottles of the treated sludge were shaken at 2 minute intervals to keep the sludge in contact with the supernatant until the time when the dissolved oxygen in them was to be determined. The dissolved oxygen was determined on two of these after 30 minutes, on another pair after 90 minutes, and on the final pair after 180 minutes of this

treatment. After the analysis for dissolved oxygen in the 30-minute samples with one treatment combination had been completed, another set of eight bottles was prepared with another combination of reagents and the sludge mixture added in the manner described, followed by identical analytical treatment. This process was repeated until all of the desired reagents or combinations of reagents had been studied. The mean results from the duplicate bottles in each experiment are shown in table 3. The results indicated by footnote (1) are those in which the duplicates did not check within 0.3 p. p. m. The control experiments in this table indicated that the untreated sludge absorbed oxygen rapidly, for only 35 to 40 percent of the initial quantity present remained after 15 minutes. Experiments 10 and 11 showed that sodium azide alone was not effective in stopping biochemical oxidation. In experiment 11 about 10 times the concentration of this reagent ordinarily used to destroy nitrite in the dissolved oxygen determination decreased the oxygen absorption so that 52.9 percent of the original was recovered after 30 minutes.

TABLE 3.—*Comparison of treatment procedures for the prevention of oxygen adsorption in activated sludge*

Experiment No.	Treatment used to stop biochemical oxidation (Reagents added to a 500 ml bottle)	pH resulting from treatment	Dissolved oxygen present after indicated time in minutes, parts per million					Percent of dissolved oxygen recovered after the indicated time in minutes			
			0	15	30	90	180	15	30	90	180
1	5 ml copper sulfate solution	4.6	7.16		5.58	4.10	2.59		77.9	57.3	36.2
2	5 ml copper nitrate solution (10 percent)	4.5	7.68	--	6.55	5.13	[illegible].47	--	85.3	66.8	45.2
3	1.4 ml. concentrated, H_2SO_4 +2.5 ml sodium azide solution	1.6	6.88	-----	6.23	6.17	5.77	---	90.6	89.7	83.9
4	5 ml. $MnSO_4$ and sulfamic acid+2.5 sodium azide	3.1	7.28	-----	6.66	6.35	6.05	---	91.5	87.2	83.1
5	4 ml sulfamic acid+2.5 sodium azide	4.4	[1]7.30	----	6.81	6.11	5.35	--	93.3	83.7	73.3
6[3]	0.5 ml dilute acetic+2.5 sodium azide.	4.5	7.41	-----	6.72	6.16	4.93	--	90.7	83.1	66.5
7	2.5 ml copper sulfate+0.5 ml. dilute acetic+4 ml sulfamic	3.4	7.57	-----	6.81	6.12	5.64	--	90.0	80.8	74.5
8[4]	0.5 ml. dilute acetic+4 ml sulfamic	4.0	6.26	---	5.23	[1]3.59	[1]2.11	--	83.0	57.3	33.7
9[5]	0.5 ml. dilute acetic+4 ml. sulfamic+2.5 ml. sodium azide.	4.1	[1]6.67		6.10	5.43	4.72	---	91.5	81.4	70.8
10	2.5 ml. sodium azide	6.8	[1]5.45		0.71	0.00	0.00		13.0	0.00	-----
11	10 ml. sodium azide	6.8	[1]4.99	4.00	[1]2.64	[2]0.31	-	80.2	52.9	[2]6.2	-----
Control	For Nos. 1 to 5 untreated	6.8	7.30	2.59	----		----	35.5	-----	------	-----
Control	For Nos. 6 to 11 untreated	6.8	7.41	2.92	----	--	----	39.4	------	------	-----

[1] Determinations in which the duplicates varied more than 0.3 parts per million.
[2] 60-minute observation.
[3] Sludge settled poorly.
[4] Excellent settling.
[5] Good settling.

The copper salts used were not as effective in stopping oxidation as the combinations of reagents used in later experiments. Copper acetate was also tried and, whereas it gave a good settling sludge, its effectiveness in arresting respiration was of the same order as the

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sulfate and nitrate. The concentration of copper used in these experiments is undesirable because it prevents the complete destruction of nitrites by the azide treatment. It also prevents obtaining an easily recognized sharp end point in the titration using starch as an indicator. As the copper salts are not as effective in stopping oxidation as other reagents, cause poor end points in titrations, and do not permit the effective use of azide for nitrite destruction, their use for preliminary treatment seems undesirable.

The results of the third series of experiments (table 3) show again that sulfuric acid and azide treatment, which lowers the sludge pH to 1.6, is very effective in stopping oxygen utilization by the sludge. The initial dissolved oxygen data in this series of experiments are not entirely comparable, because the experiments were performed on 2 days and there was a variation in aeration rate, especially in experiments 6 to 11. However, the results of these experiments indicate again that treatment with sulfuric acid and azide to lower the pH to 1.6 results in a lower initial dissolved oxygen as it would be expected that the initial dissolved oxygen found here would be between the values found in experiments 2 and 4.

The most effective combinations in stopping biochemical oxidation, in addition to those shown for series 3, were found in experiments 4, 5, 6, and 9. It will be noticed that in all these sodium azide was used and the pH of the sludge resulting from the treatment was between 3.1 and 4.5. However, it was found that the introduction of sodium azide in any of these combinations resulted in the generation of some gaseous hydrogen azide, HN_3. The release of this poisonous gas into the atmosphere while the bottles were being filled was sufficient to produce immediate severe headache in all persons who participated in the experiments.

Although the azide treatment in any of these combinations was very desirable in preventing oxygen absorption, it was considered too hazardous for practical use.

The result of experiment 7 showed that a reduction in the amount of copper sulfate to one-half that used in experiment 1 with the addition of acetic acid and sulfamic acid was also very effective in reducing oxygen absorption. Upon the basis of dissolved oxygen depletion in 30 minutes, this treatment was almost twice as effective as copper sulfate alone. Experiment 8 indicates the possibility of using acetic acid and sulfamic acid together for decreasing oxygen absorption.

A number of experiments were, therefore, carried out using a 30-minute time for reaction with slight variations of the sludge treatment given in experiments 7 and 8. The dissolved oxygen initially and after 30 minutes was also determined upon similar sludge samples by the method used in experiment 9 (table 3), employing acetic and

sulfamic acids and azide as a standard. The mean results obtained, employing the technique already described on duplicate portions in every case, are shown in table 4. These data indicate that procedures 7 and 9, shown in table 3, are about equally effective in preventing biochemical oxidation for a 30-minute period. Treatment with sulfamic acid and acetic acid was not quite as effective as the other two combinations. However, even this treatment is more effective in stopping oxidation than the original copper sulfate treatment. In addition, it destroys any nitrite present in the sludge which copper sulfate, of course, does not do.

TABLE 4.—*Comparison of oxygen depletion after 30 minutes in activated sludge mixtures treated by promising methods to reduce biochemical oxidation*

[Temperature of sludge in these tests 25° to 28° C.]

Treatment used to stop biochemical oxidation. (Reagents added to a 500 ml. bottle)	Sample	pH resulting from treatment	Dissolved oxygen, parts per million		Depletion in 30 minutes, parts per million
			Initial	After 30 minutes	
4 ml sulfamic+0.5 ml dilute acetic+2.5 ml sodium azide (This treatment No. 9 from table 3 was used as a standard of comparison)	1	4.2	6.11	5.34	0.77
	2	4.1	2.35	1.87	.48
	3	4.4	5.10	4.39	.71
	4	4.2	5.81	5.25	.56
Mean					.63
5 ml of 5 percent $Cu(C_2H_3O_2)_2$+8 ml sulfamic+0.5 ml. dilute acetic (This treatment was similar to No. 7 of table 3 except that 10 percent copper acetate solution was substituted for copper sulfate)	1[1]	2.9	6.42	5.58	.84
	2	4.2	2.51	2.11	.40
	2a	4.2	2.59	2.08	.51
	3	4.3	5.89	5.18	.71
	3a	4.4	5.55	5.03	.52
Mean					.59
8 ml. sulfamic+0.5 ml. dilute acetic	1	3.0	6.12	5.11	1.01
8 ml. sulfamic+0.5 ml. dilute acetic	1a	3.0	6.21	5.24	.97
8 ml. sulfamic+0.5 ml. dilute acetic	2	2.7	2.40	1.74	.66
8 ml. sulfamic+0.5 ml. dilute acetic	3	2.6	5.31	4.47	.87
4 ml. sulfamic+1.0 ml. dilute acetic	4	3.5	5.85	5.20	.65
8 ml. sulfamic+0.5 ml. dilute acetic	4a	2.8	5.87	5.21	.66
8 ml. sulfamic+1.0 ml. dilute acetic (Treatment No. 8 of table 3).	4b	2.8	5.81	5.15	.66
Mean					.78

[1] In this sample $CuSO_4$ was used as in No. 9 of table 3.

In actual practice in determining dissolved oxygen in sludge liquors, the sludge is not kept in contact with the supernatant, as was done in the previous experiments, but is allowed to settle immediately after it is collected and mixed with the respiratory inhibitor. Consequently, a few additional experiments were carried out in this manner, the dissolved oxygen being determined on the supernatant after 5 minutes of settling and again after a 30-minute period. The data shown in table 5 indicate that is it immaterial which copper salt is used with sulfamic and acetic acid. In the six tests made the dissolved oxygen depletion in 30 minutes varied from 0.02 to 0.17 p. p. m. With

sulfamic and acetic acid together, but no copper salt, a depletion of 0.34 p. p. m. of oxygen was obtained in 30 minutes on one of these samples.

On the basis of the foregoing experiments, it is concluded that a combination of copper sulfate, sulfamic acid, and acetic acid is most effective and desirable for arresting respiration in activated sludge when all factors are considered. It is realized that many other combinations of reagents may be used satisfactorily for this purpose, if care is taken to remove and analyze the supernatant as soon as possible after collection and contact with the inhibitors. Any one of the reagents in this combination could even be used alone, but this combination of the three is superior to any of the individual reagents or to any pair of reagents for treating activated sludge in determining dissolved oxygen. It has been demonstrated that when a sludge is collected in contact with these reagents, mixed, and allowed to settle for 30 minutes a higher dissolved oxygen will be obtained than from the same sludge sample from which the solids are removed mechanically as rapidly as possible by centrifuging. This demonstrates that it is extremely important to arrest the respiration instantly with the collection of the sludge sample.

TABLE 5.—*Comparison of supernatant dissolved oxygen results in sludge treated with respiratory inhibitors after 5 and 30 minutes of settling*

[Temperature of sludge in these tests 24° to 25° C.]

Treatment used to stop biochemical oxidation	Sample No	pH resulting from treatment	Dissolv gen in natant per m — Initially		Depletion of supernatant in 30 minutes, parts per million
Modification of No 7 of table 3, acetic and sulfamic as in No. 7					
A+2.5 ml. $CuSO_4$	1	2 9	6 84	6 78	0 06
	2	3 4	2 64	2 54	10
B+2.5 ml $Cu(NO_3)_2$	1	3 0	6 82	6 80	.02
	2	3 2	2 66	2 49	17
C+5 ml 5 percent $Cu(C_2H_3O_2)_2$	1	4 2	6 80	6 69	11
	2	3 4	2 68	2 65	03
No 8 of table 3 8 ml sulfamic, 0.5 ml dilute acetic	1	3 0	6 60	6 51	09
	2	4 4	2 47	2 13	.34
	3	----------	6 14	6 14	00

One series of experiments was carried out to determine the effectiveness of the respiration-inhibiting reagents in eliminating nitrites during the sludge treatment. To follow this reaction satisfactorily quantities of nitrite were added to the sludge, after which the sludge was siphoned in the manner described previously, into 500 ml. bottles containing the reagents. After mixing, the bottles were allowed to stand, the nitrites being determined in the supernatant after 15 and 30 minutes. The results obtained, shown in table 6, indicate that the acetic acid sodium azide treatment was not very effective in eliminating nitrites

in sludge liquors. This confirms the work of Brandt (*16*). When sulfamic acid was added to the above two reagents, the nitrite destruction reaction rate was increased. Treatment with sulfamic acid and acetic acid, and this combination with copper sulfate, was most effective in destroying nitrites in activated sludge liquors.

TABLE 6.—*Nitrite destruction in activated sludge liquors by respiration inhibiting reagents*

Treatment used on activated sludge sample. (Reagents added to a 500 ml bottle)	Initial NO_2 added to activated sludge, parts per million N	NO_2 recovered after indicated time in minutes, parts per million N	
		15	30
0 5 ml. dilute acetic+2 5 ml sodium azide solution	12 24 36	9 0 22 0 28.0	5 0 18 0 28.0
4 ml sulfamic+0 5 ml dilute acetic+2.5 ml. sodium azide solution	12 24 36	4 0 9 0 12 0	2 0 5 2 6 0
8 ml sulfamic +0 5 ml dilute acetic	12 24 36	2 8 1.2	None None 1
2 5 ml $CuSO_4$ solution +8 ml. sulfamic +0.5 ml dilute acetic	12 24 36	None .3 1.0	None None 06
5 ml $CuSO_4$ solution	12 24 36	12 0 24.0 28 0	12 0 24 0 28 0

PROPERTIES OF SULFAMIC ACID

As sulfamic acid (NH_2SO_2OH) has not been used in sewage analysis heretofore, its properties will be briefly reviewed from Audrieth, et al. (*17*). It is a crystalline, nonhygroscopic solid, melting with decomposition at 205° C. Its solubility in 100 grams of water varies from 14.69 at 0° C. to 47.08 at 80° C., and is decreased by the presence of sulfuric acids. Sulfamic acid is highly ionized in aqueous solution and is of relatively the same strength as hydrochloric, nitric, and sulfuric acids. This acid has been recommended as a primary standard in acidimetry and can be titrated using indicators whose transition points lie within the pH range of 4.5 to 9.0.

Solutions of sulfamic acid are rapidly decomposed by the addition of nitrite:

$$NH_2SO_2OH + NaNO_2 \xrightarrow{H+} NaHSO_4 + N_2 + H_2O$$

This reaction takes place quantitatively and may, therefore, be used for qualitative or quantitative determination of either sulfamic acid or nitrite. In the reagent suggested for inhibiting respiration in sludge, the sulfamic acid reacts with any nitrite present in accordance with the above reaction with the liberation of nitrogen gas. Neither

the sulfamic acid nor the products formed by it interfere in any way with the subsequent determination of dissolved oxygen. Sulfamic acid, however, does react with oxides, hydroxides, and carbonates to form sulfamates. As most sulfamates are soluble in water, the formation of copper, manganese, or sodium sulfamates in the process of sludge treatment or dissolved oxygen determination does not introduce any difficulty.

The sulfamic acid can, however, be oxidized or hydrolyzed and this would make the inhibiting reagent worthless as far as nitrite destruction is concerned. In the cold chlorine, bromine and chlorates oxidize sulfamic acid to sulfuric acid, but potassium permanganate, chromic acid, and ferric chloride exert no oxidizing action. Under the same conditions as those existing during the dissolved oxygen determination, iodine exerts no apparent oxidizing action on sulfamic acid.

Hydrolysis of sulfamic acid (that is conversion from an ammonosulfuric acid into an aquosulfuric acid) takes place in accordance with the following reaction:

$$NH_2SO_2OH + HOH \longrightarrow H_2SO_4 + NH_3 \text{ (or } NH_4HSO_4\text{)}$$

This reaction takes place very slowly at ordinary temperatures for, according to Audrieth et al. (*17*), no appreciable concentration of sulfate ion could be detected until after several weeks. At higher temperatures the hydrolysis becomes quite rapid, 40 percent of a 10 percent solution being hydrolyzed in 6 hours at 80° C. according to Cupery (*18*). In view of this rapid hydrolysis caution in heating to obtain solution of sulfamic acid and copper sulfate in the preparation of the inhibiting reagent is advised. To what extent hydrolysis of the sulfamic acid takes place in this reagent at ordinary temperatures is unknown at present. It has been found that the reagent has maintained its effectiveness in the destruction of nitrites for 45 days after preparation. The efficiency of the mixed reagent as a respiratory inhibitor in activated sludge would be but slightly affected, if at all, by hydrolysis of the sulfamic acid due to the continued activity of its other constituents.

PREPARATION OF THE INHIBITORY REAGENT

The inhibitory reagent is prepared in the following manner: Fifty gm. of copper sulfate are dissolved in 500 ml. of distilled water. Thirty-two gm. of sulfamic acid are then dissolved in 475 ml. of wate and the two solutions, together with 25 ml. of glacial acetic acid are mixed. Solution of the sulfamic acid may be slow but can be accomplished by stirring. Heat should not be used to facilitate solution nor should the mixture be exposed to beat at any subsequent time as this hastens the hydrolysis of sulfamic acid. The technical

grade sulfamic acid may give a slight turbidity. This turbidity may be disregarded as it does not affect the efficiency of the reagent, or it may be removed by filtration. Five ml. of this reagent correspond to the 2.5 ml. of 10 percent copper sulfate, 0.5 ml. of 1:4 acetic acid, and 8 ml. of 2 percent sulfamic acid as used in 500 ml. bottles in the experimental work. In general, 1 ml. of the inhibitory reagent is used for each 100 ml. portion of sample.

RECOMMENDED PROCEDURE FOR DETERMINING DISSOLVED OXYGEN

In practice, 10 ml. of the inhibitory reagent are added to a 1-liter bottle. The sample of mixed liquor is siphoned or allowed to flow into the bottle to overflowing, with reasonable caution to avoid aeration, the stopper inserted, and the bottle inverted several times to mix the contents. The sludge is allowed to settle for 5 or 10 minutes, or until the sludge has settled sufficiently to permit siphoning the supernatant into a 300-ml. bottle without obtaining sludge solids. If the sludge is bulking badly a period of 30 to 40 minutes may be allowed for the sludge to settle. There will be no appreciable loss of oxygen within this time provided continuous agitation is avoided. The agitation incidental to transportation of the mixed liquor sample containing the inhibiting reagent from a collection point to a laboratory within easy walking distance should not be detrimental. The dissolved oxygen is determined on the supernatant in the 300-ml. bottle by the short Winkler technique. Two ml. of the standard manganous sulfate and 3 ml. of alkaline iodide containing sodium azide [4] are added and the sample is shaken for 30 seconds. Two ml. of concentrated sulfuric acid are added and the sample is shaken. If it is desired to titrate 200 ml. of the original sample, 203.4 ml. are measured out and titrated with standard N/40 thiosulfate solution.

SUMMARY

An inhibiting reagent composed of sulfamic acid, acetic acid, and copper sulfate is proposed. This reagent is about twice as effective as copper sulfate used alone, though it contains only one-half the original concentration of this salt and consequently does not interfere with the end point in the iodine titration. When activated sludge is brought into contact with this reagent, oxygen absorption is stopped, nitrites are destroyed, and the sludge is coagulated. The dissolved oxygen may then be determined upon the separated supernatant by the application of the short Winkler procedure employing sodium azide in the alkaline iodide solution. The determination of dissolved oxygen in activated sludge mixtures by this procedure is simple and dependable and has been found especially valuable in actual operating practice.

[4] The standard alkaline iodide solution containing 8 gm. of sodium azide per liter.

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PROVISIONAL MORTALITY RATES FOR THE FIRST QUARTER OF 1942

The mortality rates in this report are based upon preliminary data from 27 States, the District of Columbia, Alaska, and Hawaii for the first 3 months of 1942. Comparative data for 26 States and the District of Columbia are presented also for the first 3 months of 1940 and 1941.

This report is made possible through a cooperative arrangement with the respective States, which voluntarily furnish provisional monthly tabulations of current birth and death statistics to the United States

Public Health Service, which analyzes and publishes the data. Because of lack of uniformity in the method of classifying deaths according to cause, as well as some delay in filing certificates, these data are preliminary and may differ in some instances from the final figures subsequently published by the Bureau of the Census.

In the past, however, these preliminary reports have accurately reflected the trend in mortality rates for the country as a whole. Some deviation from the final figures, especially those for specific causes of death, for individual States may be expected because of the provisional nature of the information Nevertheless, it is believed that the trend in mortality within each State is correctly represented. Comparisons of specific causes of death for different States are subject to error because of variations in tabulation procedure and promptness of filing the original certificates. Such comparisons should be based upon the final figures published by the Bureau of the Census.

The mortality rate from all causes during the first 3 months of 1942 was nearly 8 percent less than the corresponding rate for 1941 and 10 percent less than the rate for 1940 The decrease in the death rate was widespread; only 4 of the 27 States for which data are available reported a higher rate in 1942 than in 1941.

This decrease in the mortality rate was made possible by a decrease in the death rate from every important cause except cancer. However, about one-half of the decrease resulted from the unusually low death rates from influenza and pneumonia Each of the 27 States reported that the death rate for influenza was lower than the rate for last year, while 24 States reported a lower death rate for pneumonia.

The only diseases, other than cancer, with a higher death rate in 1942 are measles and diarrhea and enteritis, each of which is relatively unimportant as a cause of death.

The death rate for automobile accidents dropped from 22.9 per 100,000 in 1941 to 21.8 in 1942, a decrease of about 5 percent. A further decrease in the number of fatal automobile accidents can be expected during the remaining months of 1942, due to gasoline rationing and the difficulty of replacing worn-out tires.

The birth rate continued to increase; the rate for the current quarter is about 5 percent higher than the rate for the first quarter of 1941, and nearly 12 percent higher than the rate for the first quarter of 1940.

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Provisional mortality from certain causes in the first 3 months of 1942, with comparative provisional data for the corresponding period in preceding years

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1 2)	Dysentery (27)	Diarrhea and enteritis under 2 years (119)	Scarlet fever (8)	Diphtheria (10)	Whooping cough (9)	Measles (35)	Cerebrospinal (meningococcus) meningitis (6)	Acute poliomyelitis and polioencephalitis (36)	Acute infectious encephalitis (lethargic) (37)	Tuberculosis, all forms (13-22)	Syphilis (30)	Influenza (grippe) (33)	Pneumonia, all forms (107-109)	Cancer, all forms (45-55)	Diabetes mellitus (61)	Cerebral hemorrhage, embolism, and thrombosis (83a, b)	Diseases of the heart (90-95)	Nephritis, all forms (130-132)	All accidents, including automobile accidents (169-195)	Automobile accidents (170a, b, c)
27 States:[1]																									
1942	11.0	18.3	49	2.8	0.3	0.4	3.5	0.4	0.8	2.1	1.7	0.7	0.2	0.4	44.2	12.2	16.3	67	119	28.3	97	322	79	65	21.8
1941	11.9	17.5	53	3.0	.5	(2)	3.4	.4	.8	3.2	1.6	.7	.3	.6	47.4	(2)	47.7	81	116	31.1	99	337	86	68	22.9
1940	12.2	16.4	54	4.2	.5	(2)	3.4	.8	1.3	2.1	.5	.8	.3	.6	48.0	(2)	37.5	90	118	31.4	105	337	92	67	18.9
Industrial policyholders:[3]																									
1942	8.1	----		--	.1		[4] 3.6	.6	.6	1.0	.6	-	----	------	42.6	10.2	7.3	42	103	30.0	66	[5] 175	[6] 56	51	20.2
1941	8.5	--		--	.5		[4] 3.3	.6	.7	1.5	.8				45.3	11.6	20.8	51	107	33.5	68	[5] 185	[6] 60	47	19.8
1940	8.5	-			.5		[4] 3.7	[illegible]	1.2	1.5	.4				45.6	12.0	16.5	57	105	33.3	67	[5] 182	[6] 64	44	15.7
Alaska:																									
1942	16.2	26.5	107	2.0	(7)	(7)	10.7	(7)	5.3	16.0	5.3	(7)	(7)	(7)	239.8	(7)	26.6	112	91	16.0	59	213	37	256	10.7
1941	21.0	29.2	132	7.2	5.4	(2)	(7)	(7)	(7)	21.7	162.6	(7)	5.4	(7)	498.5	(2)	113.8	146	81	5.4	81	206	43	146	(7)
1940	19.0	23.4	175	(7)	(7)	(2)	10.9	(7)	(7)	76.6	136.8	(7)	(7)	(7)	404.8	(2)	16.4	164	82	(7)	71	181	11	142	(7)
Connecticut:																									
1942	9.7	14.8	32	3.0	(7)	(7)	3.0	(7)	(7)	.2	.2	.5	(7)	(7)	34.4	7.0	3.0	32	125	34.6	88	334	66	53	15.9
1941	10.2	11.6	41	4.3	.5	(2)	2.1	.5	(7)	.2	.2	.5	.2	(7)	31.3	(2)	14.4	50	134	40.5	91	367	80	53	15.3
1940	11.6	14.0	38	3.0	(7)	(2)	1.6	(7)	.2	.7	.5	.5	(7)	(7)	36.2	(2)	8.2	74	157	21.1	125	369	71	54	15.5
Delaware:																									
1942	13.0	18.6	38	(7)	(7)	(7)	4.4	3.0	(7)	(7)	(7)	(7)	(7)	(7)	57.8	5.9	11.9	95	119	20.8	135	454	125	65	17.8
1941	14.1	19.2	49	(7)	(7)	(2)	4.5	3.0	(7)	7.5	1.5	(7)	(7)	(7)	58.5	(2)	36.0	102	116	22.5	126	443	162	62	24.0
1940	13.4	16.2	55	3.7	(7)	(2)	3.0	3.0	(7)	3.0	(7)	1.5	(7)	(7)	46.7	(2)	33.1	92	154	46.7	117	426	134	38	12.0
District of Columbia:																									
1942	11.1	24.4	41	2.2	(7)	(7)	10.1	(7)	(7)	4.8	(7)	1.4	(7)	(7)	58.2	21.7	6.3	82	125	25.5	78	304	102	67	20.7
1941	12.9	23.7	46	3.7	.5	(2)	7.1	(7)	1.1	1.6	.5	1.6	.5	(7)	59.1	(2)	12.6	116	151	29.6	85	339	105	71	21.9
1940	14.2	21.1	48	2.0	(7)	(2)	5.3	.6	.6	3.0	(7)	.6	.6	(7)	62.4	(2)	20.2	130	144	39.2	97	405	136	62	16.0
Florida:																									
1942	12.5	18.7	59	3.7	2.0	2.4	7.2	.2	2.6	1.6	5.2	1.2	(7)	.2	46.6	17.6	26.4	73	98	22.6	125	322	75	96	35.0
1941	14.7	18.1	57	5.3	1.2	(2)	5.4	(7)	1.0	2.1	.2	1.2	1.9	.6	51.0	(2)	76.2	76	102	29.6	147	392	105	144	45.9
1940	14.9	16.1	60	6.9	.6	(2)	5.0	.2	1.3	1.7	.4	.4	.2	.4	54.1	(2)	69.0	91	106	27.8	140	398	108	107	41.4

Georgia																									
1942	8.8	19.1	67	3.2	3	1.1	2.8	1	1.5	1.9	4.5	5	3	1	35.7	12.0	29.1	75	56	12.0	89	157	92	57	20.9
1941	10.4	18.7	71	3.2	5	(2)	3.5	4	1.4	3.9	2.8	5	6	(7)	40.9	(2)	91.8	79	58	15.6	99	201	98	65	27.0
1940	10.8	17.9	68	5.7	5	(2)	2.3	8	2.2	1.9	6	4	3	(7)	45.6	(2)	76.0	105	60	12.5	104	203	98	62	19.0
Hawaii																									
1942	7.2	23.5	43	1.2	2.8	(7)	6.5	(7)	(7)	5.6	(7)	9	(7)	(7)	41.8	7.4	4.6	61	78	13.0	33	144	67	53	19.5
1941	7.5	22.0	55	1.7	9	(7)	10.4	(7)	(7)	1.9	3.8	(7)	9	9	53.8	(2)	3.8	56	88	12.3	55	136	59	57	16.0
1940	7.8	22.1	55	1.7	3.8	(2)	5.7	(7)	2.9	3.8	(7)	1.0	1.9	(7)	75.1	(2)	5.7	54	67	16.2	50	133	68	48	8.6
Idaho																									
1942	9.1	20.6	41	1.4	7	( )	(7)	(7)	7	7	7	(7)	(7)	7	16.4	2.2	12.7	52	68	17.2	96	264	58	74	17.2
1941	8.6	22.0	43	1.4	8	(7)	1.5	( )	(7)	6.1	(7)	1.5	(7)	2.3	7.6	(2)	28.0	47	83	20.5	81	224	58	73	18.2
1940	9.3	21.5	38	5.0	(7)	(2)	2.3	2.3	8	(7)	1.5	3.1	(7)	8	16.0	(2)	24.4	53	85	17.6	60	250	64	70	18.3
Indiana																									
1942	11.5	18.2	38	3.7	2	2	2.3	5	7	1.2	2	(7)	4	6	40.4	10.5	29.2	73	123	12.5	144	283	82	73	30.6
1941	12.4	16.7	48	2.9	5	(2)	1.6	7	1.9	2.0	9	7	2	1	38.9	(2)	54.0	87	123	15.8	146	311	73	83	36.2
1940	13.1	16.3	46	3.3	6	(2)	2.6	2.3	1.4	2.8	1	2	2	7	40.2	(2)	50.8	99	124	19.3	166	368	94	72	27.4
Iowa																									
1942	9.9	16.7	40	3.1	(7)	2	2.1	2	2	1.4	1.3	(7)	2	5	14.0	6.0	13.8	51	136	24.1	114	297	58	63	17.3
1941	10.7	18.0	39	3.1	3	(2)	1.1	5	3	1.1	8	3	(7)	2	14.0	(2)	35.0	76	131	30.2	112	315	65	54	17.7
1940	11.9	16.5	43	3.0	5	(2)	1.7	6	9	5	6	5	5	1.6	16.1	(2)	42.4	80	143	31.7	128	337	78	69	19.3
Kansas																									
1942	11.2	18.1	38	2.0	(7)	(7)	2.9	9	(7)	4	1.3	2	2	1.3	24.4	10.3	29.8	50	127	31.4	127	328	96	72	21.5
1941	11.9	16.6	47	2.7	(7)	(7)	2.5	2	4	4.7	2.5	1.3	(7)	1.1	25.6	(2)	58.5	67	120	30.9	111	332	116	71	26.9
1940	11.6	14.3	45	4.4	( )	(2)	2.0	9	1.1	1.6	2.0	1.1	(7)	7	24.2	(2)	45.4	59	125	31.6	112	310	113	71	18.7
Kentucky																									
1942	10.2	(2)	(2)	(2)	8	1.5	3.4	1.4	2.5	4.9	1.4	1.3	6	1	61.1	8.8	30.9	91	80	14.8	95	247	83	75	16.5
1941	11.6	17.8	71	5.2	1.0	(2)	3.5	1.1	1.0	9.6	6.1	1.8	1.0	1	75.4	(2)	115.9	104	81	21.1	110	241	83	64	22.4
1940	11.5	18.6	66	5.4	8	(2)	4.2	8	1.8	4.1	1.1	8	1.3	4	73.2	(2)	63.6	106	79	16.2	118	240	76	74	17.9
Louisiana																									
1942	10.2	21.1	58	3.2	1.3	8	6.7	(7)	2.7	1.8	1.5	1.2	3	5	49.3	23.2	25.9	71	89	18.2	72	258	79	59	18.4
1941	11.6	21.9	69	3.7	2.9	(2)	6.4	5	1.9	2.7	2	1.0	5	(7)	62.4	(2)	77.3	94	85	20.0	78	291	94	65	21.6
1940	13.7	20.0	74	6.3	2.0	(2)	6.6	2	2.5	6.3	8	5	7	2	64.1	(2)	84.1	139	85	24.1	81	313	112	77	20.2
Maine																									
1942	13.1	20.0	46	1.9	5	(7)	6.1	9	(7)	9	3.8	1.4	(7)	9	28.8	8.5	18.4	64	149	35.9	140	383	86	69	22.7
1941	14.5	16.8	62	2.3	(7)	(2)	4.7	5	(7)	2.4	5	9	5	9	34.7	(2)	59.8	102	159	39.9	133	402	115	73	21.8
1940	13.0	16.7	57	5.7	5	(2)	7.6	1.9	1.4	2.4	1.4	1.9	(7)	5	25.6	(2)	22.7	73	135	34.6	136	395	89	65	19.9
Maryland																									
1942	12.9	18.9	50	2.2	2	(7)	4.6	4	4	7	1.3	2.8	(7)	7	73.9	19.3	8.9	92	140	33.5	108	390	130	74	29.1
1941	13.6	17.9	54	1.8	4	(2)	5.9	2	(7)	5.3	(7)	1.3	2	(7)	78.0	(2)	27.5	98	148	38.4	104	409	136	81	28.8
1940	14.7	16.8	58	3.7	7	(2)	2.9	7	7	3.7	2	4	4	2	90.7	(2)	22.7	117	139	41.0	118	422	172	73	18.9
Montana																									
1942	9.9	18.4	48	3.1	(7)	(7)	2.2	7	2.2	2.2	(7)	7	(7)	7	38.0	13.6	8.6	53	103	10.0	100	272	59	67	21.5
1941	10.6	19.9	46	2.2	7	(2)	2.2	1.4	2.9	(7)	(7)	1.4	(7)	(7)	48.3	(2)	49.7	67	100	14.4	100	253	56	81	29.6
1940	10.2	19.8	39	4.3	(7)	(2)	3.6	3.6	7	1.4	2.9	1.4	(7)	7	43.8	(2)	20.8	63	114	7.9	98	228	65	66	19.4
Nebraska																									
1942	9.5	16.9	37	2.2	(7)	3	9	3	6	9	3	3	3	6	12.4	8.7	17.7	40	129	28.2	91	277	65	55	13.9
1941	10.7	16.7	44	2.8	3	(2)	9	(7)	(7)	1.9	(7)	9	9	3	16.7	(2)	68.5	68	131	27.3	126	254	73	51	14.9
1940	10.8	16.4	39	2.4	(7)	(2)	9	1.5	9	(7)	3	9	(7)	(7)	19.9	(2)	38.2	74	134	35.2	129	272	60	56	14.1

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Provisional mortality from certain causes in the first 3 months of 1942, with comparative provisional data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1-2)	Dysentery (27)	Diarrhea and enteritis under 2 years (119)	Scarlet fever (8)	Diphtheria (10)	Whooping cough (9)	Measles (35)	Cerebrospinal (meningococcus) meningitis (6)	Acute poliomyelitis and polioencephalitis (36)	Acute infectious encephalitis (lethargic) (37)	Tuberculosis, all forms (13-22)	Syphilis (30)	Influenza (grippe) (33)	Pneumonia, all forms (107-109)	Cancer, all forms (45-55)	Diabetes mellitus (61)	Cerebral hemorrhage, embolism, and thrombosis (83a, b)	Diseases of the heart (90-95)	Nephritis, all forms (130-132)	All accidents, including automobile accidents (169-195)	Automobile accidents (170a, b, c)
Nevada:																									
1942	16.0	19.1	48	(7)	(7)	(7)	(7)	(7)	(7)	10.6	(7)	(7)	(7)	3.5	81.3	10.6	10.6	50	141	14.1	113	435	74	325	99.0
1941	11.8	17.2	44	4.2	7.2	(2)	(7)	(7)	(7)	3.6	(7)	(7)	(7)	(7)	50.4	(2)	21.6	65	126	14.4	65	317	58	169	79.2
1940	12.1	18.7	39	5.8	(7)	(2)	(7)	(7)	(7)	(7)	(7)	3.6	3.6	(7)	40.0	(2)	10.9	124	109	18.2	80	273	58	124	40.0
New Mexico:																									
1942	10.3	25.3	102	1.7	7	4.4	10.9	(7)	2.2	13.1	10.9	7	(7)	.7	61.2	12.4	28.4	107	47	7.3	37	149	52	68	32.0
1941	11.1	26.7	99	3.1	3.0	(2)	8.9	(7)	3.0	11.9	17.8	(7)	(7)	(7)	71.3	(2)	42.4	87	60	12.6	38	135	51	86	39.4
1940	11.3	33.6	76	3.6	2.3	(2)	7.5	(7)	.8	6.8	(7)	(7)	(7)	(7)	73.0	(2)	27.1	81	51	11.3	53	123	54	84	34.6
New York:																									
1942	11.6	16.2	34	2.2	1	.1	2.9	.2	.1	.8	1	.8	1	.9	47.4	14.9	3.1	54	168	42.4	78	427	63	59	16.0
1941	12.4	14.6	38	2.1	1	(2)	2.8	5	(8)	.9	5	6	(8)	1.3	48.6	(2)	10.9	70	158	46.6	81	454	69	56	14.8
1940	12.2	14.0	39	3.4	1	(2)	2.9	5	1	1.3	2	3	(8)	.9	48.8	(2)	6.3	67	158	45.2	81	436	73	58	14.0
North Carolina:																									
1942	8.8	23.6	63	3.8	.3	8	5.3	6	1.1	5.0	3.5	7	.1	.1	46.7	7.7	16.9	81	56	13.8	87	173	83	68	29.1
1941	10.2	22.7	72	4.8	6	(2)	3.8	.3	2.7	5.6	1.9	.3	3	.2	50.5	(2)	75.6	101	59	15.2	86	168	92	74	34.1
1940	10.5	21.4	69	5.8	.7	(2)	5.3	.4	4.7	2.1	6	.6	.1	1	52.7	(2)	61.0	102	58	18.0	96	159	110	63	23.4
North Dakota:																									
1942	6.1	16.4	43	3.1	6	6	5.7	.6	(7)	1.9	1.9	(7)	(7)	1.3	21.0	1.9	5.7	26	76	17.2	71	157	32	25	8.3
1941	8.0	22.7	46	6	(7)	(2)	4.5	6	2.5	1.3	1.3	(7)	(7)	.6	23.5	(2)	21.0	44	85	17.8	71	213	39	49	12.7
1940	8.6	21.3	45	2.1	1.3	(2)	5.0	2.5	2.5	1.9	.6	(7)	(7)	1.9	20.1	(2)	17.6	50	107	28.9	77	209	43	50	13.8
Ohio:																									
1942	11.9	17.5	44	2.3	2	1	2.7	.4	.5	2.8	.8	1	.1	.1	39.5	12.9	16.7	74	135	37.0	113	361	85	82	31.2
1941	12.2	14.7	46	2.5	2	(2)	3.6	4	.4	2.9	1.2	4	3	7	42.6	(2)	40.1	73	133	34.6	111	354	80	85	30.5
1940	12.8	15.5	44	3.9	.6	(2)	3.3	1.0	.6	1.9	(7)	.8	.1	3	43.9	(2)	27.9	88	140	33.5	124	363	88	87	25.5
Oklahoma:																									
1942	12.0	27.0	44	3.6	7	1.0	2.1	.5	3.7	3.0	11.8	.9	1.0	9	56.7	8.2	28.2	86	110	21.9	107	255	71	85	23.1
1941	10.2	20.5	58	3.6	3	(2)	1.9	.5	3.7	4.9	3	.3	.2	3	48.0	(2)	71.2	101	81	20.0	87	209	61	59	22.8
1940	10.3	18.5	54	3.5	1.2	(2)	2.9	.5	4.8	1.4	3	2.1	1.7	3	50.8	(2)	54.4	108	80	19.6	88	192	64	57	17.2

Pennsylvania.																									
1942	12.0	(2)	(2)	(2)	2	1	3.7	5	2	1.8	1.0	3	2	(8)	39.9	10.7	11.3	60	127	36.7	95	388	96	46	17.6
1941	12.5	18.7	40	2.3	2	(2)	3.7	4	4	1.8	1.0	.3	2	.5	43.0	(2)	30.3	75	122	40.9	95	410	104	55	15.7
1940	12.8	14.4	54	3.3	6	(2)	3.9	9	8	1.2	1	1.3	3	.7	42.5	(2)	27.4	85	125	44.1	97	393	116	54	14.0
Tennessee:																									
1942	9.5	17.1	64	3.6	4	4	1.6	8	.7	2.2	1.9	5	1.0	4	70.4	12.6	31.6	87	72	15.9	85	190	63	64	18.7
1941	10.7	15.8	75	3.6	7	(2)	3.8	3	1.0	6.6	3.2	1.8	3	8	82.2	(2)	92.5	109	76	15.4	80	180	70	54	17.2
1940	11.4	15.5	71	5.9	.3	(2)	2.2	1.0	1.7	2.8	1.1	.7	1	3	77.4	(2)	71.1	128	70	19.3	95	226	64	63	13.2
Utah.																									
1942	8.9	26.9	36	1.3	7	7	2.9	7	(7)	(7)	1.4	(7)	(7)	1	13.7	7.2	15.2	35	93	13.7	57	300	62	66	26.0
1941	8.6	22.7	38	3	(7)	(2)	6.6	(7)	(7)	1.5	(7)	(7)	(7)	(7)	13.1	(2)	22.6	42	68	21.9	58	288	53	61	23.3
1940	8.9	23.2	41	2.8	(7)	(2)	2.2	2.9	(7)	1.5	2.2	.7	.7	.7	17.5	(2)	23.3	48	90	15.3	66	255	59	65	27.0
Vermont:																									
1942	12.2	18.3	41	3.7	(7)	1.1	4.5	1.1	1.1	2.3	(7)	1.1	(7)	(7)	35.0	5.6	11.3	52	135	29.3	117	365	85	50	14.7
1941	12.9	17.6	51	4.5	(7)	(2)	6.8	(7)	(7)	(7)	(7)	2.3	(7)	(7)	49.6	(2)	44.0	80	156	31.6	138	436	106	61	11.3
1940	11.9	18.5	42	1.8	1.1	(2)	4.5	(7)	(7)	2.2	(7)	1.1	(7)	(7)	41.4	(2)	28.0	94	125	21.3	136	372	87	83	9.0
Virginia																									
1942	11.5	19.8	70	3.7	4	9	4.0	6	1.8	4.4	1.5	2.4	1	6	58.9	18.7	22.1	95	82	20.3	116	274	95	79	28.7
1941	13.1	18.7	87	4.0	7	(2)	3.4	3	1.3	9.9	1.6	1.0	3	(7)	66.3	(2)	85.3	107	83	21.4	117	300	118	87	30.5
1940	12.9	18.0	78	4.6	6	(2)	4.2	4	2.5	5.1	7	1.6	3	9	59.2	(2)	65.9	126	79	24.1	116	296	123	78	21.7
Wisconsin:																									
1942	9.7	17.4	35	2.0	1	(7)	2.5	1.1	3	8	5	(7)	(7)	.5	24.3	5.1	7.6	48	129	29.9	97	312	56	54	19.5
1941	10.2	15.6	44	2.3	3	(2)	1.4	1.3	1	1.2	9	1	3	9	24.6	(2)	25.8	61	134	29.6	96	311	58	56	18.7
1940	10.8	16.0	42	3.8	(7)	(2)	3.1	8	.4	5	6	4	1	.4	26.0	(2)	24.6	76	135	31.5	105	325	61	73	18.0

[1] The District of Columbia is included as a State. Estimated population July 1, 1942, 70,979,500. Includes all of the States listed below except Wisconsin.
[2] Data not available.
[3] These data are taken from the April 1942 Statistical Bulletin published by the Metropolitan Life Insurance Co. The rates for 1941 and 1942 are subject to correction as they are based on provisional estimates of lives exposed to risk. Data do not include all diseases reported to the Public Health Service.
[4] Classified as diarrhea and enteritis. Age not specified.
[5] Excludes pericarditis, acute endocarditis and acute myocarditis.
[6] Chronic nephritis only.
[7] No deaths reported.
[8] Less than 1/10 of 1 per 100,000 inhabitants.

DEATHS DURING WEEK ENDED JULY 4, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 4, 1942	Corresponding week, 1941
Data from 87 large cities of the United States:		
Total deaths	7,599	7,711
Average for 3 prior years	7,296	
Total deaths, first 26 weeks of year	223,479	227,278
Deaths per 1,000 population, first 26 weeks of year, annual rate	12.1	12.3
Deaths under 1 year of age	536	438
Average for 3 prior years	439	
Deaths under 1 year of age, first 26 weeks of year	14,374	13,298
Data from industrial insurance companies.		
Policies in force	64,947,038	64,397,986
Number of death claims	10,896	8,913
Death claims per 1,000 policies in force, annual rate	8.7	7.2
Death claims per 1,000 policies, first 26 weeks of year, annual rate	9.7	10.1

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JULY 11, 1942

Summary

The incidence of meningococcus meningitis for the current week is twice as high as the 5-year (1937-41) median and above that for any other corresponding week since 1937. Of the current total of 61 cases, 17 occurred in the Middle Atlantic States and 11 each in the New England and South Atlantic States, or approximately 64 percent of the total from these 3 areas.

The number of cases of poliomyelitis reported for the current week (59), is slightly more than half of the 5-year median expectancy (101 cases). The largest number of cases was reported in the West South Central area, where Arkansas reported 12 cases, the same number as reported for the preceding week. Tennessee reported 5 cases and Georgia and Alabama 4 each. No other State reported more than 3 cases.

The incidence of measles dropped below the 5-year median during the week. The number of cases of diphtheria increased from 136 to 164, and of typhoid fever from 166 to 214. Smallpox, with only 9 cases, continues below the incidence for the corresponding week of any other prior year.

Other reports include 2 cases of anthrax (1 each in Delaware and Texas); 20 cases of amebic dysentery, 482 cases of bacillary dysentery (408 in Texas), and 394 cases of unspecified dysentery (348 in Virginia); 24 cases of Rocky Mountain spotted fever, of which only 5 occurred in the Mountain States; 25 cases of tularemia (9 in Arkansas); and 65 cases of endemic typhus fever (20 in Georgia, 18 in Texas, and 10 in Alabama).

The death rate for the current week in 88 large cities in the United States is 10.6 per 1,000 population, as compared with 10.7 last week and a 3-year (1939–41) average for the week of 11.0. The accumulated rate to date is 12.0 as compared with 12.3 last year.

The death rate for the United States in 1941 was 10.5 per 1,000 population, the lowest in the history of the death registration area. In 1938 and 1939 it reached the previous low of 10.6, while in 1940 it increased slightly to 10.8.

Telegraphic morbidity reports from State health officers for the week ended July 11, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	July 11, 1942	July 12, 1941		July 11, 1942	July 12, 1941		July 11, 1942	July 12, 1941		July 11, 1942	July 12, 1941	
NEW ENG.												
Maine	1	0	0	----	----	----	38	103	21	4	0	0
New Hampshire	0	0	0	----	----	----	15	15	15	0	0	0
Vermont	0	0	0	----	----	----	74	47	30	0	0	0
Massachusetts	8	4	4	----	----	----	365	493	361	5	2	2
Rhode Island	0	1	0	----	----	----	50	9	20	0	0	0
Connecticut	1	1	1	----	----	1	145	220	43	2	0	0
MID. ATL.												
New York	7	14	15	[1] 1	[1] 3	[1] 1	605	915	738	10	8	4
New Jersey	1	6	8	1	1	2	285	500	500	3	3	0
Pennsylvania	0	4	9	----	----	----	196	1,086	630	4	3	3
E. NO. CEN.												
Ohio	3	2	8	4	1	2	62	435	246	0	1	1
Indiana	2	1	4	10	5	4	22	81	31	0	0	0
Illinois	13	12	25	4	2	3	73	228	228	1	1	1
Michigan [2]	2	4	4	----	1	----	118	518	370	2	1	1
Wisconsin	0	1	1	13	6	9	509	606	606	1	1	0
W. NO. CEN.												
Minnesota	4	1	1	1	----	----	80	7	18	0	0	0
Iowa	1	4	2	1	2	----	68	71	71	0	0	0
Missouri	5	1	3		----	----	38	58	16	2	1	0
North Dakota	3	3	0	1	----	----	7	8	8	0	0	0
South Dakota	2	0	0	1	----	----	10	7	0	0	1	0
Nebraska	1	0	1	2	----	----	37	9	9	0	0	1
Kansas	0	1	3		----	----	41	55	31	1	1	1
SO. ATL.												
Delaware	0	0	0	----	----	----	1	6	2	2	0	0
Maryland [2]	3	1	1	1	1	1	31	247	17	5	1	0
Dist. of Col.	2	0	2			----	11	37	34	0	0	0
Virginia	3	2	6	20	26	19	29	279	128	1	0	1
West Virginia	1	1	2	2	4	4	2	171	34	0	0	0
North Carolina	3	3	3				43	285	127	1	1	1
South Carolina	9	8	4	122	105	105	52	182	18	0	0	0
Georgia	1	2	7	5	6	4	15	93	10	1	0	0
Florida	1	1	3		23	2	13	16	13	1	0	1
E. SO. CEN.												
Kentucky	3	1	2			3	11	77	45	0	0	1
Tennessee	4	1	3	16	21	12	9	71	46	3	3	3
Alabama	5	5	6	8	5	5	13	62	42	1	2	2
Mississippi [2]	8	3	4	----	----	----	----	----	----	1	1	1
W. SO. CEN.												
Arkansas	5	2	3	1	1	3	21	50	16	1	1	1
Louisiana	4	1	6	1	1	10	24	1	4	1	0	0
Oklahoma	3	3	3	3	5	5	27	41	17	0	1	1
Texas	[3] 28	7	13	122	253	60	68	80	99	4	1	1
MOUNTAIN												
Montana	2	3	0	----	----	----	44	21	21	1	0	0
Idaho	0	1	1		----	----	56	3	3	0	1	0
Wyoming	0	0	0	36	----	----	21	5	5	1	0	0
Colorado	5	4	5	21	6	----	43	32	32	0	0	0
New Mexico	0	1	1	----	----	----	4	13	10	0	0	0
Arizona	2	0	0	19	27	24	18	37	17	0	0	0
Utah [2]	0	0	0	----	----	----	168	8	46	0	0	0
Nevada	0	0	----	----	----	----	10	26	----	0	0	----
PACIFIC												
Washington	1	0	1	----	3	----	283	7	48	0	0	0
Oregon	1	4	1	1	7	6	52	17	17	0	0	0
California	16	12	22	21	33	10	856	179	179	2	0	2
Total	164	126	197	438	548	326	4,763	7,467	4,840	61	35	32
27 weeks	[3] 6,478	6,525	10,424	78,564	485,941	157,683	455,427	809,400	338,261	2,080	1,245	1,245

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 11, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	July 11, 1942	July 12, 1941		July 11, 1942	July 12, 1941		July 11, 1942	July 12, 1941		July 11, 1942	July 12, 1941	
NEW ENG.												
Maine	0	0	0	7	0	3	0	0	0	0	0	2
New Hampshire	0	0	0	5	1	1	0	0	0	0	0	0
Vermont	0	0	0	0	3	2	0	0	0	0	0	0
Massachusetts	2	0	0	60	62	66	0	0	0	6	3	2
Rhode Island	0	0	0	1	0	6	0	0	0	1	1	0
Connecticut	0	0	1	14	8	23	0	0	0	1	0	2
MID. ATL.												
New York	2	2	2	110	113	141	0	0	0	8	8	5
New Jersey	0	0	0	34	37	43	0	0	0	3	2	3
Pennsylvania	1	7	0	74	50	122	0	0	0	6	8	8
E. NO. CEN.												
Ohio	0	3	1	61	47	52	0	0	1	5	6	7
Indiana	3	1	1	10	22	22	1	0	3	3	7	7
Illinois	2	9	2	57	97	133	3	4	4	2	12	9
Michigan [3]	0	3	3	41	74	102	0	4	0	4	5	3
Wisconsin	0	0	1	47	37	53	0	0	1	1	1	0
W. NO. CEN.												
Minnesota	0	6	0	21	20	24	0	0	2	5	0	0
Iowa	2	2	2	10	17	17	0	2	16	0	0	1
Missouri	1	1	1	12	18	18	2	0	4	6	9	9
North Dakota	0	0	0	9	1	3	0	0	5	0	1	1
South Dakota	0	2	0	7	3	5	0	4	6	0	1	0
Nebraska	0	0	0	7	9	5	1	0	1	0	0	0
Kansas	0	0	0	16	19	25	1	0	0	1	1	1
SO. ATL.												
Delaware	1	0	0	3	4	2	0	0	0	1	1	0
Maryland [3]	0	1	0	18	14	12	0	0	0	2	5	5
Dist. of Col.	0	0	0	11	3	3	0	0	0	0	0	0
Virginia	0	5	1	10	8	10	0	0	0	4	8	16
West Virginia	1	0	0	12	15	14	0	0	0	6	4	5
North Carolina	1	0	2	6	1	15	0	0	0	4	7	11
South Carolina	0	13	3	3	6	3	0	0	0	6	10	21
Georgia	4	40	6	8	7	7	0	0	0	17	19	25
Florida	2	11	0	2	0	1	0	0	0	8	5	2
E. SO. CEN.												
Kentucky	2	10	3	20	24	14	0	0	0	11	10	23
Tennessee	5	5	2	14	17	13	0	0	0	14	11	24
Alabama	4	40	5	5	8	9	0	0	1	8	7	7
Mississippi [3]	1	2	2	1	10	7	0	0	0	6	7	12
W. SO. CEN.												
Arkansas	12	0	0	3	0	2	0	0	0	8	14	17
Louisiana	1	1	1	5	1	4	0	0	0	24	12	21
Oklahoma	2	1	2	2	11	8	0	0	2	2	17	16
Texas	2	1	4	9	10	17	1	0	2	37	27	43
MOUNTAIN												
Montana	0	0	0	3	14	6	0	0	5	0	0	1
Idaho	1	0	0	4	10	1	0	1	2	1	1	0
Wyoming	1	0	0	3	1	2	0	0	0	0	0	0
Colorado	0	0	0	6	5	11	0	0	0	0	1	2
New Mexico	1	0	0	2	0	3	0	0	0	0	0	2
Arizona	0	0	1	3	0	1	0	0	0	1	3	3
Utah [3]	0	0	0	5	4	6	0	0	0	1	0	0
Nevada	0	0	------	2	0	------	0	0	------	0	0	------
PACIFIC												
Washington	0	5	0	8	11	13	0	0	2	0	1	1
Oregon	2	1	1	2	4	5	0	1	1	1	0	0
California	3	8	8	44	58	58	0	0	2	0	4	4
Total	59	180	101	826	884	1,225	9	16	96	214	239	361
27 weeks	668	937	905	85,119	85,928	111,719	577	1,109	7,466	2,592	2,893	4,164

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 11, 1942—Continued

Division and State	Whooping cough		Week ended July 11, 1942								
	Week ended—		Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt spotted fever	Tularemia	Typhus fever
	July 11, 1942	July 12, 1941		Amebic	Bacillary	Unspecified					
NEW ENG.											
Maine	28	27	0	0	0	0	0	0	0	0	0
New Hampshire	4	1	0	0	0	0	0	0	0	0	0
Vermont	55	1	0	0	0	0	0	0	0	0	0
Massachusetts	221	116	0	0	0	0	0	0	0	0	0
Rhode Island	24	12	0	0	0	0	0	0	0	0	0
Connecticut	61	21	0	0	1	0	0	0	0	0	0
MID. ATL.											
New York	371	301	0	1	22	0	1	0	1	0	0
New Jersey	231	135	0	6	0	0	0	0	1	0	0
Pennsylvania	216	293	0	0	1	0	0	0	1	0	0
E. NO. CEN.											
Ohio	184	267	0	0	0	1	0	0	1	0	0
Indiana	62	30	0	0	0	0	0	0	0	0	0
Illinois	382	145	0	0	8	0	0	0	3	0	0
Michigan [2]	167	268	0	0	0	0	1	0	0	0	0
Wisconsin	223	168	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	41	76	0	1	0	0	1	0	0	1	0
Iowa	27	55	0	0	0	0	0	0	1	0	0
Missouri	13	64	0	0	0	0	0	0	1	0	0
North Dakota	2	20	0	0	0	0	1	0	0	1	0
South Dakota	0	3	0	0	0	0	0	0	2	0	0
Nebraska	13	11	0	0	0	0	0	0	0	0	0
Kansas	69	164	0	0	0	0	1	0	0	3	0
SO. ATL.											
Delaware	2	7	1	0	0	0	0	0	0	0	0
Maryland [3]	45	65	0	0	0	0	0	0	3	0	0
Dist. of Col.	22	1	0	0	0	0	0	0	0	0	0
Virginia	57	46	0	0	0	348	0	0	3	2	0
West Virginia	15	38	0	0	0	0	0	0	0	0	0
North Carolina	86	229	0	0	0	0	0	0	0	0	0
South Carolina	65	165	0	0	0	0	0	0	0	0	6
Georgia	14	10	0	1	6	0	0	0	0	1	20
Florida	18	13		0	0	0	0	0	0	0	5
E. SO. CEN.											
Kentucky	75	64	0	0	6	0	0	0	0	0	0
Tennessee	22	56	0	0	0	13	1	0	0	3	1
Alabama	51	26	0	0	0	0	0	0	0	0	10
Mississippi [2]	------	----	0	0	0	0	0	0	2	0	1
W. SO. CEN.											
Arkansas	20	18	0	5	15	0	0	0	0	9	0
Louisiana	9	27	0	0	2	0	0	0	0	0	4
Oklahoma	12	27	0	0	0	0	0	0	0	0	0
Texas	203	203	1	4	408	0	0	0	0	0	18
MOUNTAIN											
Montana	17	10	0	0	0	0	0	0	1	0	0
Idaho	5	27	0	0	0	0	0	0	1	0	0
Wyoming	17	10	0	0	0	0	0	0	2	0	0
Colorado	33	196	0	0	0	0	0	0	1	0	0
New Mexico	24	15	0	0	4	0	0	0	0	1	0
Arizona	6	14	0	0	0	32	0	0	0	0	0
Utah [2]	31	79	0	0	0	0	0	0	0	1	0
Nevada	2	24	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	25	117	0	0	0	0	0	0	0	0	0
Oregon	30	16	0	0	0	0	0	0	0	0	0
California	222	402	0	2	9	0	3	0	0	3	0
Total	3,522	4,078	2	20	482	394	9	0	24	25	65
27 weeks	102,036	123,938									

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] A later report shows 11 cases of diphtheria in Texas for the week ended July 4, instead of 1 case as previously reported.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 27, 1942

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	5	0	0	0	1	0	2	0	1	1
Baltimore, Md	1	0	------	0	36	8	2	0	12	0	0	42
Barre, Vt	0	0	------	0	3	0	0	0	0	0	0	6
Billings, Mont	0	0	------	0	10	0	0	0	0	0	0	1
Birmingham, Ala	0	0	6	0	0	1	3	0	0	0	0	2
Boise, Idaho	0	0	------	0	2	0	0	0	0	0	0	0
Boston, Mass	1	0	------	0	143	3	9	0	33	0	2	28
Bridgeport, Conn	0	0	------	0	1	0	0	0	7	0	0	4
Brunswick, Ga	0	0	------	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	1	0	------	1	10	1	7	0	6	0	0	2
Camden, N. J	0	0	------	0	0	0	0	0	9	0	0	7
Charleston, S. C	0	0	1	2	0	0	0	0	0	0	0	0
Charleston, W. Va	0	0	------	0	0	0	0	0	0	0	0	0
Chicago, Ill	9	0	2	0	20	0	20	0	51	0	0	155
Cincinnati, Ohio	1	0	1	0	3	1	1	0	10	0	0	7
Cleveland, Ohio	2	0	1	0	2	0	2	0	20	0	0	35
Columbus, Ohio	0	0	------	0	8	0	3	0	8	0	0	13
Concord, N. H	0	0	------	0	3	0	1	0	0	0	0	0
Cumberland, Md	0	0	------	0	0	0	0	0	0	0	0	0
Dallas, Tex	3	0	------	0	2	0	0	0	0	0	1	13
Denver, Colo	2	0	3	1	52	0	1	0	1	0	1	10
Detroit, Mich	1	0	------	0	38	0	15	0	63	0	1	39
Duluth, Minn	0	0	------	0	0	0	0	0	0	0	0	6
Fall River, Mass	0	0	------	0	6	0	1	0	10	0	0	2
Fargo, N. Dak	0	1	------	0	1	0	0	0	0	0	0	1
Flint, Mich	0	0	------	0	2	0	3	0	2	0	0	1
Fort Wayne, Ind	0	0	------	0	0	0	1	0	0	0	0	3
Frederick, Md	0	0	------	0	0	0	1	0	0	0	0	0
Galveston, Tex	0	0	------	0	0	0	4	0	0	0	0	4
Grand Rapids, Mich	0	0	------	0	0	0	0	0	1	0	0	7
Great Falls, Mont	0	0	------	0	3	0	1	0	0	0	0	3
Hartford, Conn	0	0	------	0	36	0	0	0	3	0	0	14
Helena, Mont	0	0	------	0	4	0	2	0	0	0	0	0
Houston, Tex	5	0	------	0	3	0	4	0	0	0	1	2
Indianapolis, Ind	1	0	------	0	25	0	1	0	4	0	0	16
Kansas City, Mo	0	0	------	0	21	0	2	0	6	0	0	1
Kenosha, Wis	0	0	------	0	6	0	0	0	0	0	0	16
Little Rock, Ark	0	0	2	0	1	0	2	0	1	0	0	------
Los Angeles, Calif	2	0	6	0	296	4	9	0	9	0	1	24
Lynchburg, Va	0	0	------	0	0	0	0	0	0	0	0	7
Memphis, Tenn	0	0	1	0	12	0	4	0	1	0	0	39
Milwaukee, Wis	0	0	------	0	335	0	0	0	16	0	0	25
Minneapolis, Minn	1	0	------	1	27	1	5	1	6	0	0	3
Missoula, Mont	0	0	------	0	0	0	0	0	1	0	0	0
Mobile, Ala	0	0	------	0	0	0	2	0	0	0	0	0
Nashville, Tenn	0	0	------	0	6	0	1	0	1	0	0	1
Newark, N. J	0	0	2	0	82	0	0	0	6	0	0	39
New Haven, Conn	0	0	------	0	11	1	2	0	0	0	0	2
New Orleans, La	2	0	1	1	29	1	3	2	1	0	3	3
New York, N. Y	9	1	2	0	71	11	38	2	77	0	6	215
Omaha, Nebr	0	0	------	0	10	0	0	0	1	0	0	4
Philadelphia, Pa	1	0	1	0	25	5	7	0	49	0	0	54
Pittsburgh, Pa	0	0	1	0	6	0	4	0	5	0	0	16
Portland, Maine	0	0	------	0	27	0	0	0	2	0	0	0
Providence, R. I	1	0	------	0	100	0	2	0	0	0	0	12
Pueblo, Colo	0	0	------	0	0	0	0	1	2	0	0	1
Racine, Wis	0	0	------	0	33	0	0	0	3	0	0	16
Raleigh, N. C	0	0	------	0	2	0	0	0	0	0	0	1
Reading, Pa	0	0	------	0	1	0	1	0	2	0	0	4
Richmond, Va	0	0	2	2	5	0	3	0	2	0	0	4

See footnotes at end of table.

City reports for week ended June 27, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va	0	0		0	0	0	0	0	0	0	1	0
Rochester, N. Y	0	0		0	4	0	2	0	2	0	1	15
Sacramento, Calif	0	0		0	6	0	4	2	1	0	0	8
Saint Louis, Mo	0	0		0	14	0	3	1	1	0	0	2
Saint Paul, Minn	0	0		0	30	0	1	0	2	0	0	18
Salt Lake City, Utah	0	0		0	263	0	4	0	2	0	0	12
San Antonio, Tex	0	0		0	3	0	6	0	1	0	0	6
San Francisco, Calif	0	0		0	222	2	3	0	9	0	0	6
Savannah, Ga	0	0	5	0	2	0	0	0	0	0	0	0
Seattle, Wash	2	0		0	275	0	6	0	0	0	0	23
Shreveport, La	0	0		1	0	0	5	0	0	0	1	0
South Bend, Ind	0	0		0	0	0	0	0	0	0	0	1
Spokane, Wash	0	0		0	89	0	0	0	1	0	0	3
Springfield, Ill	0	0		0	4	0	0	0	2	0	0	0
Springfield, Mass	0	0		0	24	0	4	0	13	0	0	3
Superior, Wis	0	0		0	9	0	0	0	2	0	0	0
Syracuse, N Y	0	0		0	314	0	5	0	0	0	0	25
Tacoma, Wash	0	0		0	26	0	1	0	0	0	0	0
Tampa, Fla	0	0		0	1	0	2	0	0	0	0	0
Terre Haute, Ind	0	0		0	0	0	1	0	0	0	0	0
Topeka, Kans	0	0		0	7	0	1	0	1	0	0	4
Trenton, N. J	0	0		0	0	0	2	0	3	0	0	6
Washington, D. C	2	0		0	42	2	9	0	8	0	1	28
Wheeling, W. Va	0	0		0	2	0	1	0	0	0	0	3
Wichita, Kans	0	0		0	18	0	4	0	1	0	0	4
Wilmington, Del	0	0		0	1	0	1	0	2	0	2	1
Wilmington, N C	0	0		0	0	0	1	0	0	0	0	16
Winston-Salem, N C	0	0		0	2	0	0	0	0	0	1	0
Worcester, Mass	0	0		0	2	0	11	0	9	0	0	48

Dysentery, amebic.—Cases Boston 1, Los Angeles, 1; Minneapolis, 1, New York, 1, St. Louis, 1.
Dysentery, bacillary—Cases Baltimore, 3, Detroit, 2, Little Rock, 1, Los Angeles, 6, New York, 2, Richmond, 1
Leprosy.—Cases Los Angeles, 1.
Rocky Mountain spotted fever—Cases Galveston, 2, Spokane, 1
Tularemia.—Cases. New Orleans, 1.
Typhus fever—Cases Charleston, S. C., 1, Houston, 2, New York, 3, Savannah, 1.

Rates (annual basis) per 100,000 population, for the group of 89 cities in the preceding table (estimated population, 1942, 34,058,487)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Week ended June 27, 1942	7 20	6.43	1.38	440 77	37 51	75 48	0 00	3 67	174 90
Average for week, 1937-41	12 69	4.64	2.17	[1]444 54	43 48	119 61	1 08	5 11	190.63

[1] Median.

PLAGUE INFECTION IN CALIFORNIA

Plague infection has been reported proved in specimens collected in California as follows:

Kern County: May 5, in a pool of 343 fleas from 28 ground squirrels (*C. beecheyi*) collected 12 miles east of Wheeler Ridge, Castac Lake area.

Lassen County: June 2, in tissue from 1 ground squirrel (*C. beldingi*) found dead 3 miles south and 9 miles east of Amedee.

Monterey County: June 20, in organs from 1 ground squirrel (*C. beecheyi*) taken at Fort Ord Military Reservation, 12 miles southwest of Salinas.

San Louis Obispo County: In organs from ground squirrels (*C. beecheyi*) as follows: June 7, in organs from 10 squirrels taken 43 miles east of Arroyo Grande, and in organs from 13 squirrels taken 2½ miles north and 8 miles east of Santa Maria; June 10, in organs from 10 squirrels taken from the same location.

Santa Barbara County: June 7, in organs from 13 ground squirrels (*C. beecheyi*) taken 12 miles east and 2 miles north of Santa Maria.

Siskiyou County: June 5, in mass pool of tissue from 5 ground squirrels (*C. douglasii*) taken from the Siskiyou Fair Grounds, 1½ miles south of Yreka.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—During the week ended June 20, 1942, a plague infected rat was reported in the Kapulena area and another rat was reported in Honokaa, Paauhau area, both in Hamakua District, Island of Hawaii, T. H. During the week ended June 13, 1942, a plague infected rat was reported in Hamakua District, Island of Hawaii, T. H., no other location being given.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended June 13, 1942.—During the week ended June 13, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		2	1	5	10	2	1		3	24
Chickenpox		14	1	117	318	49	32	23	94	648
Diphtheria		14	1	18	1	4		4		42
Dysentery				8					1	9
German measles				10	53	6	8	4	20	101
Influenza		2			3		3		9	17
Measles	2			244	258	136	10	6	42	698
Mumps	6	28		73	421	88	116	30	427	1,195
Pneumonia		5			14	3			3	25
Poliomyelitis						4			1	5
Scarlet fever		10	13	49	147	40	25	48	43	375
Tuberculosis		3	6	125	59	56	2	2	29	282
Typhoid and paratyphoid fever			1	23	1				5	30
Undulant fever					2					2
Whooping cough			2	172	69	9	2	1	103	358
Other communicable diseases		13		3	231	26	4	1	3	281

CHILE

Cerebrospinal meningitis.—According to recent information, cerebrospinal meningitis is reported to be epidemic in Santiago and Valparaiso and vicinity, Chile.

SWITZERLAND

Notifiable diseases—February 1942.—During the month of February 1942, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	28	Mumps	157
Chickenpox	126	Paratyphoid fever	18
Diphtheria	94	Poliomyelitis	12
Dysentery	1	Scarlet fever	236
German measles	23	Tuberculosis	289
Influenza	222	Undulant fever	9
Measles	615	Whooping cough	65

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS, for the last Friday in each month

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Smallpox

England and Wales—Swindon, South.—During the week ended July 4, 1942, 3 cases of smallpox were reported in Swindon, South, Central England.

Scotland—Glasgow.—During the week ended July 4, 1942, 23 cases of smallpox with 2 deaths were reported in Glasgow, Scotland.

Typhus Fever

Algeria.—During the period May 21–31, 1942, 2,235 cases (111 in Algiers, and 58 in Oran) of typhus fever were reported in Algiers.

Bulgaria.—During the week ended May 30, 1942, 10 cases of typhus fever were reported in Bulgaria.

Iraq.—During the week ended May 30, 1942, 8 cases of typhus fever were reported in Iraq.

Spain.—During the week ended June 6, 1942, 13 cases (5 in Barcelona) of typhus fever were reported in Spain.

Yellow Fever

Colombia—Santander Department—Velez.—On May 19, 1942, 1 death from yellow fever was reported in Velez, Santander Department, Colombia.

* * *

COURT DECISIONS ON PUBLIC HEALTH

Sexual sterilization—habitual criminals—Oklahoma statute held unconstitutional.—(United States Supreme Court; *Skinner* v. *State of Oklahoma ex rel. Williamson, Atty. Gen.;* decided June 1, 1942.[1]) The Oklahoma habitual criminal sterilization act defined an "habitual criminal" as a person who, having been convicted two or more times for crimes "amounting to felonies involving moral turpitude" in either an Oklahoma court or a court of any other State, was thereafter convicted of such a felony in Oklahoma and sentenced to a term of imprisonment in an Oklahoma penal institution. Provision was made (a) for the institution by the attorney general of a proceeding in the Oklahoma courts against such a person for a judgment

[1] See The United States Law Week, volume 10, number 47, June 2, 1942, page 4424; 62 S. C. 1110.

that such person should be rendered sexually sterile and (b) for notice, an opportunity to be heard, and the right to a jury trial. If the court or jury found that such person was an habitual criminal and that he could be sterilized without detriment to his general health, then the court had to render judgment to the effect that he be sterilized. The law also provided that "offenses arising out of the violation of the prohibitory laws, revenue acts, embezzlement, or political offenses" should not come or be considered within its terms.

The petitioner in the instant case was convicted in 1926 of stealing chickens and was sentenced to the Oklahoma reformatory. In 1929 he was convicted of robbery with firearms and sentenced to the reformatory, and again in 1934 he was convicted of robbery with firearms and sentenced to the penitentiary. He was confined there when the sterilization act was passed in 1935, and in 1936 the attorney general instituted proceedings against him. The court instructed the jury that the crimes of which the petitioner had been convicted were felonies involving moral turpitude and that the only question for the jury was whether the sterilization operation could be performed on petitioner without detriment to his general health. The jury found that it could and the lower court's judgment directing that the operation be performed was affirmed by the Oklahoma Supreme Court[2] against the petitioner's contention that the act was unconstitutional by reason of the 14th amendment of the Federal Constitution

Several objections to the constitutionality of the act were pressed upon the United States Supreme Court but the court passed those points without intimating an opinion on them because it said that there was a feature of the act which clearly condemned it and that was its failure to meet the requirements of the equal protection clause of the 14th amendment. As illustrative of the inequalities in the act it was pointed out by the court that in Oklahoma grand larceny, which was committed when the property taken exceeded $20 in value, was a felony and that embezzlement was punishable "in the manner prescribed for feloniously stealing property of the value of that embezzled." Hence, one who embezzled property worth more than $20 was guilty of a felony. A clerk, said the court, who appropriates over $20 from his employer's till and a stranger who steals the same amount are thus both guilty of felonies. "If the latter repeats his act and is convicted three times, he may be sterilized. But the clerk is not subject to the pains and penalties of the act no matter how large his embezzlements nor how frequent his convictions." As another example the court said that a person who entered a chicken coop and stole chickens committed a felony and could be sterilized if he was thrice convicted. If, however, he was a bailee of the prop-

[2] For an account of the decision of the Oklahoma Supreme Court see Public Health Reports, November 7, 1941, page 2185.

erty and fraudulently appropriated it, he was an embezzler. "Hence no matter how habitual his proclivities for embezzlement are and no matter how often his conviction, he may not be sterilized. Thus the nature of the two crimes is intrinsically the same and they are punishable in the same manner." It was also pointed out that under Oklahoma law the question whether a particular act was larceny by fraud or was embezzlement turned not on the intrinsic quality of the act but on when the felonious intent arose.

The guaranty of equal protection of the laws, said the court, is a pledge of the protection of equal laws. "When the law lays an unequal hand on those who have committed intrinsically the same quality of offense and sterilizes one and not the other, it has made as an invidious a discrimination as if it had selected a particular race or nationality for oppressive treatment. [Cases cited.] Sterilization of those who have thrice committed grand larceny with immunity for those who are embezzlers is a clear, pointed, unmistakable discrimination."

Milk—sale—use of paper containers.—(United States Supreme Court; *City of Chicago et al.* v. *Fieldcrest Dairies, Inc.*, 62 S. Ct. 986; decided April 27, 1942.) The city of Chicago, by a 1935 ordinance, required that milk or milk products "sold in quantities of less than 1 gallon shall be delivered in standard milk bottles." The respondent corporation sought a permit from the Chicago Board of Health to sell milk in "Pure-Pak" paper containers in that city but the permit was not granted. Thereafter the respondent filed suit in the United States district court alleging, among other things, that its "single service, sterile, sanitary and nonabsorbent" containers were "standard milk bottles" within the meaning of the Chicago ordinance and that the ordinance, if it were construed as prohibiting respondent from using its paper containers, was unconstitutional and invalid under the Federal and State constitutions. The complaint prayed for a declaratory judgment that the ordinance be construed so as not to prohibit respondent from using its containers or, in the alternative, that the ordinance, insofar as it prevented such use, was unconstitutional and invalid.

While the case was pending in the district court the so-called milk pasteurization plant law was enacted by the Illinois legislature. This statute contained certain provisions regulating the use of single service and paper containers and reserved to municipalities the power to regulate the distribution, etc., "of pasteurized milk and pasteurized milk products, provided that such regulation not permit any person to violate any of the provisions" of the act.

Later the district court held that respondent's containers were "standard milk bottles" within the meaning of the ordinance and

that under the statute mentioned the city was without power to prohibit the use of such containers. On appeal the United States circuit court of appeals held [1] that the lower court erred in holding that respondent's containers were "standard milk bottles" within the meaning of the ordinance but concluded that the ordinance, insofar as it prohibited rather than regulated the use of paper containers, was invalid by reason of the State act.

The case was carried to the United States Supreme Court by the city of Chicago and others and that court stated in its opinion that it had granted the petition for certiorari because of the doubtful propriety of the district court and the circuit court of appeals undertaking to decide such an important question of Illinois law instead of remitting the parties to the State courts for litigation of the State questions involved in the case. The court's view was that the sound discretion which guides the determination of courts of equity called in this case for a remission of the parties to the State courts which alone could give a definitive answer to the major questions posed. "Illinois has the final say as to the meaning of the ordinance in question. It also has the final word on the alleged conflict between the ordinance and the State act. The determination which the district court, the circuit court of appeals, or we might make could not be anything more than a forecast—a prediction as to the ultimate decision of the Supreme Court of Illinois."

The judgment was vacated and the cause remanded to the district court with directions to retain the bill pending a determination of proceedings in the State court in conformity with the opinion.

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[1] For an account of the decision of the United States circuit court of appeals see Public Health Reports, February 20, 1942, page 283

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

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STUDIES OF THE ACUTE DIARRHEAL DISEASES [1]

IX A. *SHIGELLA DYSENTERIAE* INFECTIONS AMONG INSTITUTIONAL INMATES

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OBJECTIVES

The study of *Shigella dysenteriae* infections has been limited almost exclusively heretofore to observations on clinical cases and their immediate contacts. This has not been adequate to provide a satisfactory epidemiological interpretation. Information is needed concerning the occurrence of these infections in healthy persons and in those with clinically insignificant enteric disturbances. The chief obstacles to extension of studies in these directions have been the difficulty of isolating *Shigella dysenteriae* from normal stools and of obtaining adequate numbers of satisfactory stool specimens for bacteriological examination. The recent introduction of highly selective media has done much to eliminate both problems. The use of desoxycholate citrate and S. S. (*Shigella-salmonella*) agars has not only increased the proportion of positive observations, but has made it possible to employ the simple rectal-swab technique for obtaining and plating fecal material as described by Hardy, Watt, and DeCapito (*1*).

The present study is part of an investigation of the occurrence of carriers of *Shigella dysenteriae*. Prevalence in the general population could be measured by single or infrequently repeated stool cultures. It was practicable to examine institutional inmates at weekly or biweekly intervals for prolonged periods and thus to observe the behavior of these infections in the course of time, also to study bacteri-

[1] From the Division of Infectious Diseases, National Institute of Health, the Bureau of Laboratories of the New York City Department of Health, the New York State Health Department (Middletown District) and the DeLamar Institute of Public Health, Columbia University.

ologically the mild diarrheal disorders which do not come to the attention of the physician or health officer serving the general population. The major objective of this investigation was to supplement the data which could be obtained from the study of the general population; the minor objective was to obtain a better understanding of the old problem of diarrheal disease among institutional inmates.

Section A of this report is concerned with the findings in a New York State institution for the mentally defective. The physical plant is justly regarded as a model and the care provided the inmates is of a correspondingly high order. Diarrheal disorders had been troublesome among the younger idiots and imbeciles. These were housed in two "cottages" (one for males and one for females), each designed to accommodate 120 individuals. The groups were isolated from each other since the cottages were at opposite ends of the spacious grounds. They were served food in their own cottages, did not attend school and rarely came in contact with other groups, except on admission to the institution's own hospital. These isolated units were selected for study. Within each group the inmates lived in the intimate relationships of children in one large family.

The investigation was undertaken in mid-June 1939, was fully established by the first of August, and was terminated the end of February 1941. The number of individuals under observation at one time averaged 123 males and 120 females and varied only slightly from this. However, the composition of the population was changed by the normal admissions, transfers, and discharges. A total of 210 males and 171 females entered the study.

METHODS

The planned procedure was to obtain stool cultures every two weeks on all members of these two groups. When the prevalence of infection was high weekly cultures were obtained, and during the fall of 1939, when the evidence indicated that *Shigella dysenteriae* infections had disappeared from the boys' cottage, monthly intervals were used. The routine was interrupted in December 1939, during the investigation of a *Salmonella typhi murium* outbreak. From that date to the end of the study the examinations were conducted at least every other week. All males and females currently in the groups were examined routinely on 42 and 50 occasions, respectively. During these times a total of 11,117 cultures were obtained. In addition, 684 diagnostic specimens were collected at irregular intervals from individuals ill with diarrhea. With the exception of a portion of the latter, all cultures were taken by the rectal-swab technique. The cultural and serological procedures previously described for the identification of *Shigella dysenteriae* were employed in the laboratory.

Satisfactory records of diarrheal disorders, particularly the mild ones, were difficult to obtain. The inmates could give no history. They were under the care of matrons and attendants, not trained nurses. Most of the observations as to illness were made by these workers. They were requested to keep a daily list of all persons with abnormal stools, including number of movements, descriptions of feces, and records of temperature. Additional reports were obtained from physicians' notes and hospital records. During weekly visits these various records were collected for entry on case cards. To a limited degree, the written reports were supplemented by information obtained directly from the physicians or matrons. It seems probable that through these channels reports were obtained of almost all moderately severe and most mild diarrheal disorders.

Agglutination tests were conducted on a limited series of unselected individuals. The only positive observations were in titers generally considered of little diagnostic significance. Since these tests were not promising, they were discontinued in favor of more extensive bacteriological studies.

CHRONOLOGY

Tables 1 and 2 are presented to show the observed course of *Shigella dysenteriae* infections in these groups. The findings on repeated cultures of all members of the groups are given first. These provide measures of the prevalence of the infection. The numbers are minimal rather than total since undoubtedly the organisms were not isolated from every individual who harbored them. The chronological distribution of the first positive cultures in each infection or reinfection is shown in the second part of the table. These were found in the routine tests on the date stated and in the diagnostic examinations between that time and the preceding routine cultures. These initial positive findings provide evidence as to rate of spread of the infection. Lastly, the number of acute attacks of diarrhea by dates of onset are given. The illnesses began in the period between the date as given and that of the preceding routine examination, or between the beginning of the study and the first examination.

It is evident that Flexner W infections were occurring commonly when the study was started. In the boys' cottage, by means of the diagnostic examinations and the first routine test on June 27, 1939, nine individuals were found to be infected. One additional boy without known illness was positive on his second routine test on August 2. This was the only evidence that this infection may have spread in this cottage later than June. This organism was last isolated from the boys on August 16, 1939.

This variety of *Shigella* was more prevalent among the girls in June and July 1939. Nineteen were found to be positive through the early

diagnostic tests and the first routine examination on July 19. On this date, 114 girls were cultured and 14 (12 percent) yielded *Shigella dysenteriae* (Flexner W). Five new infections were found during August but thereafter only three additional infections were discovered. Apparently one of the latter was acquired in the hospital dysentery ward, not in the cottage. The child, first positive on October 4, was hospitalized for a prolonged diarrheal disorder which was culturally negative until convalescence. The total number of infected persons as

TABLE 1.—*Observations on males by routine examinations, the discovered infections and reinfections and the reported diarrheal disorders by date and type of Shigella isolated*

Date	Routine examinations: Number of individuals examined	Routine examinations: Number positive for *Shigella dysenteriae*: Flexner	Routine examinations: Number positive for *Shigella dysenteriae*: Sonne	Initial positive cultures for infections and reinfections including those found by diagnostic tests[1]: Flexner	Initial positive cultures for infections and reinfections including those found by diagnostic tests[1]: Sonne	Number of reported acute diarrheal disorders: Positive for *Shigella dysenteriae*	Number of reported acute diarrheal disorders: Negative for *Shigella dysenteriae*
June 27, 1939	77	5	0	9	0	2	1
August 2, 1939	116	3	0	1	0	0	4
August 16, 1939	122	1	0	0	0	0	3
August 30, 1939	132	0	0	0	0	0	5
September 13, 1939	121	1	0	1	0	0	3
October 11, 1939	116	0	0	0	0	0	0
November 8, 1939	115	0	0	0	0	0	0
December 20, 1939	0	0	0	0	6	9	1
December 28, 1939	0	0	0	0	4	1	0
January 3, 1940	107	0	24	0	20	0	0
January 10, 1940	118	0	20	0	12	1	0
January 19, 1940	123	0	14	0	4	0	3
January 31, 1940	121	0	11	0	4	1	0
February 14, 1940	117	0	6	0	1	0	0
February 27, 1940	117	0	4	0	0	1	0
March 13, 1940	112	0	4	0	2	0	1
March 26, 1940	113	0	6	0	4	1	0
April 10, 1940	116	0	7	0	5	0	0
April 25, 1940	118	0	22	0	21	2	1
May 1, 1940	117	0	24	0	11	2	0
May 8, 1940	118	0	18	0	0	0	0
May 21, 1940	124	0	6	0	2	0	8
May 29, 1940	124	0	5	0	1	2	1
June 12, 1940	121	0	1	0	0	0	0
June 26, 1940	125	0	5	0	2	0	2
July 10, 1940	120	0	1	0	0	0	0
July 24, 1940	122	0	0	0	0	0	1
August 7, 1940	128	0	1	0	0	1	0
August 21, 1940	126	0	7	0	7	2	0
August 28, 1940	127	0	15	0	12	3	0
September 4, 1940	129	0	18	0	10	0	0
September 11, 1940	130	0	16	0	7	0	0
September 18, 1940	135	0	13	0	1	0	0
October 2, 1940	136	0	8	0	4	0	0
October 16, 1940	134	0	1	0	0	0	0
October 30, 1940	127	0	2	0	0	0	0
November 13, 1940	120	0	3	0	2	0	0
November 27, 1940	129	0	2	0	1	0	2
December 11, 1940	127	0	2	0	1	1	2
December 27, 1940	129	0	5	0	5	0	0
January 8, 1941	129	0	10	0	9	2	0
January 22, 1941	134	0	13	0	9	1	0
February 4, 1941	139	0	3	0	3	0	0
February 20, 1941	126	0	6	0	2	2	0
Total	5,137	10	310	11	172	34	33

[1] Including the time interval subsequent to the preceding routine examination or from the beginning of the study to the first routine examination.

found on the routine tests gradually decreased through August, September, and October. After November 1, Flexner W was isolated only from one carrier, a child who had 43 positive cultures in a total of 46 successive diagnostic or routine examinations. Her last positive culture was on September 25, 1940. There was no evidence of any spread from this carrier for at least 11 months.

TABLE 2.—*Observations on females by routine examinations, the discovered infections and reinfections and the reported diarrheal disorders by date and type of Shigella isolated*

Date	Routine examinations					Initial positive cultures for infections and reinfections including those found by diagnostic tests[1]				Number of reported acute diarrheal disorders				
	Number of individuals examined	Number positive for *Shigella dysenteriae*								Positive for *Shigella dysenteriae*[1]				Negative for *Shigella dysenteriae*
		Fv[2]	Fw[3]	F uncl.[3]	S[4]	Fv	Fw	F uncl.	S	Fv	Fw	F uncl.	S	
July 19, 1939	114	1	14	0	0	2	19	0	0	1	13	1	0	0
August 9, 1939	118	2	5	1	0	3	3	2	0	2	3	2	0	0
August 23, 1939	113	4	4	1	0	3	2	1	0	0	0	1	0	0
September 6, 1939	114	3	4	1	0	3	1	1	0	2	2	0	0	3
September 20, 1939	121	3	3	0	0	2	0	0	0	1	0	0	0	2
October 4, 1939	118	4	2	0	0	4	1	0	0	0	0	0	0	1
October 18, 1939	120	6	2	0	0	2	0	0	0	1	0	0	0	1
November 1, 1939	114	5	2	0	0	8	1	0	0	1	0	0	0	1
November 15, 1939	115	5	1	0	0	2	0	0	0	1	0	0	0	0
November 29, 1939	119	5	1	1	0	1	0	1	0	4	0	0	0	4
December 13, 1939	117	5	1	1	0	6	0	0	0	6	0	0	0	2
December 27, 1939	112	9	0	4	0	6	0	5	0	1	0	1	0	0
January 16, 1940	112	13	1	1	0	5	0	0	0	1	0	0	0	0
January 24, 1940	115	15	1	0	0	1	0	1	0	0	0	0	0	1
February 7, 1940	111	6	1	0	0	1	0	0	0	1	0	0	0	0
February 21, 1940	109	4	1	0	0	2	0	0	0	0	0	0	0	0
March 6, 1940	116	5	1	0	0	2	0	0	0	0	0	0	0	0
March 20, 1940	116	5	1	0	0	1	0	0	0	1	0	0	0	0
April 3, 1940	115	4	1	1	0	3	0	1	0	1	0	0	0	0
April 17, 1940	117	2	1	0	0	0	0	0	0	0	0	0	0	0
May 1, 1940	122	0	1	0	0	0	0	0	0	0	0	0	0	0
May 15, 1940	121	0	1	0	0	0	0	0	0	0	0	0	0	0
June 5, 1940	119	0	1	0	4	0	0	0	4	0	0	0	0	2
June 12, 1940	120	0	1	0	10	0	0	0	7	0	0	0	0	0
June 19, 1940	124	0	1	0	13	0	0	0	7	0	0	0	0	1
June 26, 1940	123	0	1	0	19	0	0	0	9	0	0	0	3	0
July 3, 1940	122	0	1	0	26	0	0	0	14	0	0	0	3	0
July 10, 1940	120	0	1	0	31	0	0	0	19	0	0	0	3	0
July 17, 1940	119	0	1	0	27	0	0	0	10	0	0	0	2	1
July 24, 1940	119	0	1	0	22	0	0	0	7	0	0	0	2	0
July 31, 1940	119	0	1	0	8	0	0	0	3	0	0	0	0	0
August 7, 1940	119	0	1	0	11	0	0	0	5	0	0	0	1	0
August 14, 1940	119	0	1	0	10	0	0	0	5	0	0	0	0	0
August 21, 1940	118	0	1	0	6	0	0	0	2	0	0	0	0	0
August 28, 1940	123	0	1	0	2	0	0	0	1	0	0	0	0	0
September 11, 1940	124	0	1	0	10	0	0	0	8	0	0	0	0	0
September 18, 1940	124	0	0	0	10	0	0	0	3	0	0	0	0	0
September 25, 1940	119	0	1	0	5	0	0	0	3	0	0	0	0	0
October 9, 1940	126	0	0	0	5	0	0	0	2	0	0	0	0	0
October 23, 1940	124	0	0	0	3	0	0	0	8	0	0	0	1	0
November 6, 1940	128	0	0	0	3	0	0	0	2	0	0	0	1	2
November 18, 1940	131	0	0	0	7	0	0	0	5	0	0	0	1	1
November 27, 1940	119	0	0	0	0	0	0	0	0	0	0	0	0	1
December 4, 1940	127	0	0	0	5	0	0	0	5	0	0	0	0	0
December 20, 1940	124	0	0	0	4	0	0	0	4	0	0	0	1	0
January 8, 1941	127	0	0	0	1	0	0	0	1	0	0	0	0	0
January 15, 1941	129	0	0	0	1	0	0	0	1	0	0	0	0	0
January 29, 1941	128	0	0	0	5	0	0	0	4	0	0	0	1	0
February 11, 1941	119	0	0	0	2	0	0	0	2	0	0	0	0	1
February 26, 1941	118	0	0	0	2	0	0	0	2	0	0	0	0	0
Totals	5,980	106	64	11	252	52	27	12	138	24	18	5	19	24

[1] Including the time interval subsequent to the preceding routine examination or from the beginning of the study to the first routine examination.

Flexner V was isolated from a boy on September 13, 1939. Only one positive culture was obtained. The infection was acquired and lost without any detected spread in the group. The course of Flexner V infection among the girls was very different. The microorganism was recovered from the early cultures of the girls and for a period of 9 months it was found on each routine examination. Through October 4, 1939 the number of persons found positive for *Shigella dysenteriae* on these routine examinations varied from 1 to 4; for the following five examinations there were 5 or 6. On December 27 there were 9. The two tests in January 1940, revealed 13 and 15 infected individuals. From this point the infection declined in prevalence and the last positive culture was found on April 17. The spread was slow but continuous. Each routine examination revealed from 1 to 6 newly infected individuals, with the higher numbers in December 1939, and early January 1940.

Prior to November 15, 1939 *Shigella dysenteriae* (Sonne) was not isolated. A specimen obtained on this date from a patient with diarrhea admitted to the hospital from a cottage not under observation, yielded this microorganism. Unfortunately there was delay in its identification because of preoccupation with a *Salmonella typhi murium* outbreak in the institution. During this period routine cultures on the boys were temporarily discontinued, but diagnostic specimens were obtained from all with illnesses. The introduction of Sonne infection into the study group was first detected through a culture taken on December 6 from a boy who had developed acute diarrhea on the preceding day. Additional diagnostic specimens were obtained on December 20 and 28. It was established through these examinations that 10 of the 11 boys who had symptoms in December were infected with this variety of *Shigella*. The dates of onset provided some indication of its spread during the month A new case began on each of the following dates: December 1, 5, 11, 15 (2 cases), 16, 17, 20 (2 cases), 21, and 24.

Routine examinations were resumed on January 3, 1940, when 24 (22 percent) of the 107 tested were positive for Sonne. On this day no inmate had acute diarrhea. One week later 20 positives were found. Throughout the following 4 examinations over a period of 6 weeks the number of positives progressively decreased from the above to 14, 11, 6, and 4. The known new infections decreased more rapidly. There was some spread during January but in February only 1 new infection was found.

The early course of *Shigella dysenteriae* (Sonne) infection was more thoroughly studied in the girls' cottage. This variety of *Shigella* was not isolated from this group prior to June 5, 1940. The routine cultures taken on this date revealed 4 infected individuals. Because of

this finding, weekly bacteriological examinations were carried out during each of the following 12 weeks. The total number of infected persons and the rate of spread of the infection progressively increased for 5 weeks, reaching a maximum on July 10 when 31 (26 percent) of 120 inmates were positive. Nineteen of these were newly discovered infections. Thereafter there was a rapid decline in the rate of spread of the infection and a slow decline in the total number of infected individuals.

Subsequently, through a continuously changing group of infected individuals, Sonne was able to maintain itself in both groups to the end of the period of observation. There was one marked difference in the behavior of the infection in the two groups. The spread among the boys occurred in epidemic waves, separated by periods in which there were few new infections. As many as 21 initial positive cultures were revealed by a single examination at the crest of a wave (April 25, 1940), and as few as 5 in 8 examinations during an intervening interval (May 8 to August 7, 1940). This was in marked contrast to the slow but persistent spread of the infection among the girls which followed the initial epidemic wave. There were 20 routine examinations in this period of observation (July 31, 1940, to February 26, 1941); in 18 the discovered new infections varied from 1 to 5; once 8 were found, and once none.

INCIDENCE OF DIARRHEAL DISORDERS

In analyzing the reports of illnesses, as obtained, it was considered that an attack of diarrhea was clinically significant if the individual passed four or more abnormally soft or watery stools in 1 day, even though there were no other associated abnormalities. Similarly, two abnormal stools with any other associated abnormality, or any "bloody stools," were considered to indicate significant diarrheal disorders. Likewise, if an individual had been "in bed with diarrhea" the illness was similarly classified. Disturbances of lesser degree have been disregarded. Freedom from significant diarrhea for a period of 1 month was accepted as evidence of recovery.

On applying the above criteria it was found that 194 attacks of diarrhea had been reported, 84 involving 58 boys, and 110 affecting 78 girls. These attacks are classified on the basis of laboratory findings and clinical course in table 3. Incidence of illness due to *Shigella dysenteriae* was higher among the girls, but culturally negative acute disorders were slightly more common among the boys. Other varieties of diarrheal disorders were distributed equally among the two groups. Ten cases positive late in the disorder were classed as questionable, since all cultures taken early were negative.

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TABLE 3.—*Types of reported diarrheal disorders and annual attack rates in male and female groups July 1939–February 1941*

Clinical classification	Males		Females	
	(Average population 123)		(Average population 120)	
	Reported attacks	Annual rate per 100 inmates	Reported attacks	Annual rate per 100 inmates
Acute diarrheal diseases:				
Positive for *Shigella dysenteriae*	34	16	66	33
Negative for *Shigella dysenteriae*	33	16	24	12
Questionable [1]	4	2	6	3
Amebic dysentery	9	4	9	4
Chronic diarrheal disease	[2] 4	.5	[2] 5	5
Total	84	41	110	55

[1] *Shigella dysenteriae* isolated during the course of disease but its etiological role was considered uncertain.
[2] One only in each group with onset during the period of observation.

We have listed as known or suspected amebic dysentery those cases so diagnosed in the clinical laboratory of the institution, also those diagnosed clinically which responded promptly to specific therapy. One of the males died from peritonitis, which was found at autopsy to be the result of the perforation of an amebic ulcer. A female died following a diarrheal disorder which had characteristics of a case of amebic dysentery. Recognized amebic infections were more common during the first half of the period of study.

In nine individuals diarrhea was a chronic complaint, in seven onset antedated the study. There was no uniformity in the clinical picture and the etiology was not satisfactorily determined. All but two had intercurrent infections with *Shigella dysenteriae*.

During the summer of 1939 the acute diarrheal disorders which prevailed among the males were distinct from those among the females. In the former the attacks were mild, fever was rarely present, and dysenteric stools were not observed. Among the females, the illnesses were quite severe, commonly associated with fever, and often with characteristic dysenteric stools. During the interval from the beginning of the study to September 30, 1939, *Shigella dysenteriae* was isolated from only 2 (11 percent) of 18 cases in males, whereas it was isolated from 28 (82 percent) of 34 cases in females. One positive case in a girl of 13 years terminated fatally.

During a second period, the late fall of 1939, the incidence of diarrhea in both groups remained high. Characteristically, the boys had short attacks (1 to 3 days) with watery stools and frequently a slight elevation of temperature. The girls had similar but more severe disorders. Another female, aged 7, died of a primary dysenteric infection and a terminal pneumonia. From October 1939 through February 1940 the total number of acute diarrheal attacks

was 18 for the boys and 26 for the girls, and the proportions positive for *Shigella dysenteriae* were 72 percent and 65 percent, respectively. Again the infections were distinct; in the males they were attributable to Sonne and in the females to Flexner V.

In table 4 the later months of the study have been divided to correspond with the dates for these first two periods. The acute attacks of diarrhea during the late periods were less than one-half the reported number for the preceding year. Furthermore, these cases were mild and of short duration. From June 1, 1940, only the Sonne variety of *Shigella dysenteriae* was found to be associated with these illnesses.

TABLE 4.—*Acute diarrheal disorders by cottage group, date of occurrence, and bacteriological findings*

Dates	Male					Female				
	Acute diarrheal disorders[1]	Positive for *Shigella Dysenteriae*				Acute diarrheal disorders[1]	Positive for *Shigella Dysenteriae*			
		Flexner		Sonne			Flexner		Sonne	
		Number	Percent	Number	Percent		Number	Percent	Number	Percent
June 15-Sept 30, 1939	18	2	11	0	0	34	28	82	0	0
Oct. 1, 1939-Feb 29, 1940	18	0	0	13	72	26	17	65	0	0
March 1-May 31, 1940	13	0	0	7	54	4	2	50	0	0
June 1-Sept 30, 1940	8	0	0	6	75	16	0	0	14	87
Oct. 1, 1940-Feb. 28, 1941	10	0	0	6	60	10	0	0	5	50

[1] Exclusive of group classified as questionable (table 3)

PREVALENCE OF SHIGELLA DYSENTERIAE INFECTIONS

Many of the inmates had more than one infection with *Shigella dysenteriae*. In some instances different varieties were involved. When a single variety was isolated, an arbitrary standard was necessary to classify positive findings as due either to continuing infection or reinfection. An individual was considered as free of infection after 3 negative cultures at intervals of 2 weeks, or 4 at weekly intervals. This rule was rarely needed, since in most cases the individuals when positive were consistently positive, and these periods were separated by long intervals of regularly negative examinations. The total number of detected *Shigella dysenteriae* infections was 412, 183 for the boys' group and 229 for the girls'. The average populations were 123 and 120, respectively, giving minimal total infection rates of 89 and 115 per 100 inmates per annum. The minimal annual attack rates (percent) of *Shigella dysenteriae* infections with associated symptoms, as stated in table 3, were 16 and 33, respectively. If all other infections are regarded as carrier states, the minimal carrier incidence rates per annum are 73 per 100 in one group and 82 per 100 in the other.

The proportion of individuals found to be positive increased with an increasing number of examinations. For individuals tested less than 10 times the percentage positive for *Shigella dysenteriae* was 31 for the boys and 38 for the girls. With 10 to 19 observations the percentage for each was 58. A total of 126 boys and 127 girls were examined routinely 20 or more times, and of these 85 (67 percent) and 107 (84 percent), respectively, became positive.

SEX

The males and females in this study were not members of a mixed population as is usually the case. Differences in the two entirely distinct groups could not be evaluated on the basis of sex.

AGE

The age distribution for all individuals who entered the study is shown in table 5. The incidence of all diarrheal disorders and of those due to *Shigella dysenteriae* and of all detected infections was found to vary inversely with age. Since the younger children had been for the most part more recently admitted, the observed differences could be accounted for either by chronological age or duration of residence in the institution, or both.

TABLE 5.—*The distribution by age of the diarrheal disorder and of total Shigella dysenteriae infections for all individuals who entered the study*

Date of birth	Males							Females						
	Number of individuals entering study	With diarrheal disease		With illness due to *Shigella dysenteriae*		With infection by *Shigella dysenteriae*		Number of individuals entering study	With diarrheal disease		With illness due to *Shigella dysenteriae*		With infection by *Shigella dysenteriae*	
		Number	Percent	Number	Percent	Number	Percent		Number	Percent	Number	Percent	Number	Percent
1935 or later	41	21	51	14	34	31	76	13	11	85	7	54	12	92
1930–1934	110	31	28	17	15	69	63	70	44	63	33	47	59	84
1925–1929	38	5	13	1	3	13	34	57	16	28	15	26	40	70
1920–1924	1	0	0	0	0	0	0	12	3	25	0	0	8	67
1919 or earlier	8	1	13	0	0	3	38	15	4	27	2	13	5	33
Unknown	12	-	----	--	-	2	17	4	-		---	-	2	50
Total	210	58	28	22	15	118	56	171	78	46	57	33	126	74

The evidence as to the relative importance of these variables as found among persons present throughout the respective periods of Sonne or Flexner infections is given in table 6. There was no statistically significant difference in the discovered incidence of Sonne infections between individuals under 10 years of age and those over 10 years. There was a significant variation for both younger and older individuals dependent upon duration of residence in the institution.

The data for Flexner infections are limited and not conclusive. In contrast with the findings for Sonne, chronological age appeared to have more influence than the duration of residence in the institution.

TABLE 6.—*Individuals continuously studied compared by age, date of admission to the institution, the number of reported illnesses and the prevalence of infection by variety of Shigella dysenteriae*

Variety of *Shigella*	Age at beginning of study	Year of admission	Individuals examined	Known infected individuals		Discovered *Shigella* infections		Infections with illness		Infections without illness	
				Number	Percent	Number	Per 100 individuals	Number	Per 100 individuals	Number	Per 100 individuals
Sonne	Under 10	1937–1940	97	78	80	127	131	17	18	110	113
		1936 and earlier	25	14	56	19	76	3	12	16	64
	10 and over	1937–1940	17	15	88	21	124	3	18	18	106
		1936 and earlier	49	29	59	35	71	3	6	32	65
Flexner (V and W)	Under 10	1937–1940	25	20	80	28	112	17	68	11	44
		1936 and earlier	11	9	82	9	82	7	64	2	18
	10 and over	1937–1940	12	5	42	7	58	5	42	2	17
		1936 and earlier	42	8	19	12	29	4	10	8	19

NEW ADMISSIONS AND SENIOR INMATES

Forty-one males and 12 females were admitted to the respective groups during the period in which Sonne infections were being found. In table 7 the findings on the boys admitted before December 1939 are compared with those on individuals admitted after this date. The prevalence of *Shigella dysenteriae* among those newly admitted was consistently higher. In July and November the only discovered infected individuals were in this group. It was clear that the presence of persons recently admitted facilitated the maintenance of the infection in the group. Similar variations in prevalence were observed in the females. The incidence of illness due to *Shigella dysenteriae* (Sonne) was markedly affected by the newly admitted individuals. During the last 9 months of observation of the boys, 11 of the 12 cases were among this small proportion of the inmates.

The influence of the duration of exposure in the institution on the prevalence of infection and incidence of illness is analyzed by person months of exposure in table 8. The majority (86 percent) of culturally positive illnesses occurred in the first 3 months of exposure. The total prevalence of infection was also highest during this period. For those who were under observation for a longer time there was a rapid decline in the incidence of disease and a more gradual decrease in the prevalence of carriers. After 6 months of exposure the carrier rate reached a low level which in the males, who were observed up to 15 months, continued without further decline.

TABLE 7.—*The prevalence of infection and incidence of illness due to Shigella dysenteriae Sonne in male and female inmates admitted before and after this infection was discovered in the respective groups*

MALES

Year and months	Inmates admitted before Dec. 1, 1939					Inmates admitted after Dec. 1, 1939				
	Number of routine examinations	Positive Sonne		Known new infections	Illness due to Sonne	Number of routine examinations	Positive Sonne		Known new infections	Illness due to Sonne
		Number	Percent				Number	Percent		
1939										
December	0	0	0	[1] 10	[1] 10	0	0	0	0	0
1940										
January	462	67	15	38	1	7	2	29	2	1
February	227	8	4	1	1	7	2	29	0	0
March	221	10	5	6	1	4	0	0	0	0
April	222	26	12	24	2	12	3	25	2	0
May	456	42	9	10	2	27	13	48	4	2
June	229	3	1	1	0	17	3	18	1	0
July	222	0	0	0	0	20	1	5	0	0
August	337	12	4	12	0	44	11	25	7	6
September	341	30	9	12	0	55	17	32	6	0
October	329	4	1	1	0	68	7	10	3	0
November	201	0	0	0	0	48	5	10	3	0
December	204	3	1	2	0	52	4	8	4	1
1941										
January	207	11	5	10	0	56	12	21	8	3
February	223	9	4	5	1	42	5	12	0	1
	3,881	225	6	132	18	457	85	19	40	14

FEMALES

Year and months	Inmates admitted before June 1, 1940					Inmates admitted after June 1, 1940				
1940										
June-August	1,549	187	12	91	13	15	2	13	2	1
September-November	947	38	4	22	0	48	5	10	4	3
December 1940-February 1941	816	16	2	15	1	56	4	7	4	1
	3,312	241	7	128	14	119	11	9	10	5

[1] Discovered through diagnostic tests.

The incidence of illness and the prevalence of carriers was higher in each time period (table 8) for those admitted after the infection was found in the cottages as compared with the males and females admitted earlier. There was, however, a striking decline in illnesses after 3 months and a high carrier rate in the second 3 months of exposure.

The new admissions were distributed throughout the whole period of Sonne infection. In spite of the declining prevalence of detected infections among those under continuous observation, these newly admitted individuals continued to show a high rate of infection. Thirteen entered in the 6 months after the discovery of Sonne in the groups and 10 (77 percent) were found infected during their first 3 months in the institution. Thirty-one were admitted in the later months of the study and 21 (68 percent) yielded positive cultures within 3 months. Thus, irrespective of differences in the detected

prevalence in inmates who had been in the groups from the date of the first discovery of Sonne infections, it could be shown that two-thirds or more of those newly admitted acquired at least one infecting dose of organisms within 3 months. To provide comparable observations table 8 presents only the results of routine examinations at intervals of 2 weeks. For 12 weeks after Sonne was first found in the female group fecal cultures were collected each week. These extra tests increased the known infected individuals by 22 (33 percent). These data indicate that more frequent observations would have shown a very high percentage of newly-admitted persons to be infected within 3 months of their entry into the groups. These recent arrivals were subject only to the same exposure as the other inmates. It may be concluded, therefore, that almost all of the old residents, as well as the new arrivals, acquired *Shigella dysenteriae* (Sonne) in sufficient numbers to infect susceptible individuals at least once in each 3-month period. The decline in prevalence of infection and incidence of disease was presumably a manifestation of a change in the reaction of the individual to the infection.

TABLE 8—*Shigella dysenteriae (Sonne) infections with and without associated illness found on routine examinations at intervals of 2 weeks by time of admission and by months following the beginning of exposure*

Months following beginning exposure	Group	Person[4] month of exposure to possible infection	*Shigella dysenteriae* (Sonne) infections found by routine examination at intervals of two weeks					
			With illness		Without illness		Total	
			Number	Per 100	Number	Per 100	Number	Per 100
1	Old Adm M [1]	115	[5] 10	9	------	------	------	------
	Old Adm. F. [2]	110	3	3	14	13	17	15
	New Adm [3]	36	9	25	7	19	16	44
2-3	Old Adm. M.	156	3	2	46	29	49	31
	Old Adm F.	161	10	6	39	24	49	[7] 30
	New Adm. M. & F.	38	8	21	7	18	15	39
1-3	Total	616	43	7	113	[8] 23	146	[8] 29
4 6	Old Adm M	271	3	1	31	11	34	13
	Old Adm F	275	0	0	21	8	21	8
	New Adm. M. & F.	34	1	3	13	38	14	41
	Total	580	4	1	65	11	69	12
Over 6	Old Adm. M.	853	2	([6])	31	4	33	4
	Old Adm. F.	310	1	([6])	14	5	15	5
	New Adm M. & F.	38	0	0	4	11	4	11
	Total	1,201	3	([6])	49	4	52	4

[1] Males admitted before Dec. 1, 1939.
[2] Females admitted before June 1, 1940
[3] Males admitted after Dec 1, 1939, and females admitted after June 1, 1940.
[4] That time in which a positive stool culture would be counted as a new infection or a reinfection.
[5] No routine examinations during first month Positives were found on diagnostic tests.
[6] Less than 0.5.
[7] If cultural examinations had been omitted during the first month in the female group as in the males the observations for this period would have been 147 person months with 56 (38 per 100) discovered infections.
[8] Excluding from the computation the person months when males were not examined routinely

The newly admitted individuals had 146 person months of exposure, a total of 49 known infections and 18 clinical cases of diarrhea. In contrast, there were 56 seniors who had 672 person months of exposure with no known infections. Assuming an equal hazard of coming in contact with the organism, as seemed probable from the living conditions within the cottages, it was estimated, by applying the observed rates for total infections in newly admitted, that the 56 individuals had at least 226 exposures. The organisms did not multiply or were not maintained so that they were found on culture. Whether they were actively destroyed by some protective mechanism was not evident from these data. Between these extremes there were individuals who first developed disease, later had one or two demonstrable infections without symptoms, and still later were presumably exposed with no resulting positive cultural findings.

CLINICAL VS. SUBCLINICAL INFECTIONS

Three varieties of *Shigella* were found. There was a marked difference in the proportion of these infections which resulted in clinical illnesses (table 9). The organism which most frequently gave rise to clinical symptoms was Flexner W. Exclusive of those infections in which its role in the etiology of disease was considered questionable, it accounted for 22 known infections, 20 (91 percent) with associated symptoms. There were, similarly, 44 known Flexner V infections, of which 24 (55 percent) resulted in clinical cases of diarrhea. Only 51 (16 percent) of a total of 310 Sonne infections had associated diarrheal disorders.

TABLE 9.—*The relation of illness to infection with different varieties of Shigella dysenteriae and to repeated infections with Shigella dysenteriae (Sonne)*

Variety of *Shigella dysenteriae*	Known infections [1]								
	Male			Female			Male and female		
	Total	With illness		Total	With illness		Total	With illness	
		Number	Percent		Number	Percent		Number	Percent
Flexner W	3	2	67	19	18	95	22	20	91
Flexner V	1	0	0	43	24	56	44	24	55
Sonne—Total	172	32	19	138	19	14	310	51	16
First infection	111	29	26	109	19	17	220	48	22
Second infection	48	3	6	28	0	0	76	3	4
Third infection	13	0	0	1	0	0	14	0	0

[1] Exclusive of those in which the history as to illness was uncertain

There was a difference in the individual's response to the first and subsequent infections. One hundred and eleven males were found to be infected with Sonne, 63 once only, 35 twice, and 13 three times. In the female group 109 were found infected with this organism, 81 once, 27 twice, and 1 three times. Symptoms were associated with 48 (22 percent) of the 220 first infections, but with only 3 (4 percent) of the 76 second infections. In the latter group there was an individual who after the initial attack had a persisting but very mild disorder not clinically significant according to our criteria. After 3 negative cultures the symptoms became clinically significant for a few days and the stool culture was again positive. In the others, the infections were clearly multiple but in 1 the first was without symptoms. No illness was observed with any of the 14 third infections. Flexner reinfections occurred in only 18 cases and two varieties of this organism were involved. This small number did not permit significant comparisons.

During the routine examinations, when specimens from all inmates, well and ill, were cultured, there were 191 isolations of Flexner and 562 of Sonne. Of these, 28 (15 percent) of the Flexner and 23 (4 percent) of the Sonne were obtained from individuals who were ill on the day the specimens were collected. The observed crude ratios of prevalence of clinical infection to carrier states (incubatory, convalescent, and passive) were 1:7 for Flexner and 1:24 for Sonne. Many of the illnesses, particularly those due to Sonne, were mild and of short duration. It would be possible for this infection to be widespread in a group such as those studied and remain undetected, since mild disorders are not usually examined bacteriologically

During the first 10 months of the study *Shigella dysenteriae* (Flexner) infection was prevalent among the females. Approximately one-half of these inmates were found to have been infected within this period. Sonne was first isolated 1 month later. A comparison of individuals observed at least 10 times during each period is shown in table 10. Those individuals previously infected with Flexner had a crude incidence of Sonne infection which was somewhat higher than for those with no previous positive findings. The former, as a group, were younger than the latter. An age specific comparison revealed that Sonne infections occurred with equal frequency among those previously infected with *Shigella dysenteriae* (Flexner) and those who had had no known recent infection with these organisms.

MODES OF DISSEMINATION

Observations in this field are presented in connection with part B of this report bringing together the data on all institutions studied.

TABLE 10.—*Shigella dysenteriae (Sonne) infections and illnesses related to the previous known occurrence of Flexner infections*

History of preceding Flexner infections	Number of individuals [1]	Subsequent Sonne infections			
		Total		With illness	
		Number	Percent	Number	Percent
Positive	54	44	81	6	14
Negative	60	40	67	7	18
Total	114	84	74	13	15

[1] Examined 10 or more times both in the period of Flexner and of Sonne infections.

FOLLOW-UP

The study as reported was discontinued in February 1941. Follow-up observations were made 9 months later.

Endemic diarrhea had persisted among the boys, but the cases had been few in number. The girls had been notably free of diarrheal diseases. Cultural examinations were obtained rarely but two of the hospitalized cases in the boys had positive reports for Sonne. During late October and early November 1941, we secured three cultures at weekly intervals from all inmates of the two cottages. Sonne infection was found in both groups. At the time 5 males (2 cases and 3 carriers) and 1 female (a carrier) were positive.

The continuous occurrence of the infection is not established by our findings but we favor this interpretation for these reasons: (1) Preceding observations revealed the tendency of the infection to maintain itself in the groups; (2) the positive cases during the summer revealed the presence of the infection among the boys at that time; and (3) during 20 months there was only one known introduction of *Shigella* to this institution. If the groups had become free of infection, a reintroduction of Sonne to both cottages within the 9 months would be improbable.

The natural course of the infection was not followed further. All cases and carriers were isolated and treated with sulfaguanidine until they became negative. Subsequent observations during a 4-month period indicated that the groups remained free of all *Shigella dysenteriae* infections.

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STUDIES OF THE ACUTE DIARRHEAL DISEASES

IX B. *SHIGELLA DYSENTERIAE* INFECTIONS AMONG INSTITUTIONAL INMATES[1]

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In part A of this paper, Hardy and associates reported an investigation of *Shigella dysenteriae* infections among institutional inmates in New York State. The findings in other institutions located in New Mexico, Vermont, Georgia, Puerto Rico, and New York are presented here.

AN ORPHANAGE

Attention was called to this small institution late in the fall of 1937 through the occurrence of 4 severe cases of bacillary dysentery among the 20 infants then in residence. At that time it was planned to follow the inmates by repeated cultures during the ensuing summer and fall. Work was resumed in the field laboratory in late June 1938, and weekly stool examinations were begun. A nurse was assigned one day each week to collect specimens of all stools passed during the day and to bring them to the laboratory in glycerine-saline preservative. The specimens obtained were from stools passed normally, hence it was usual for one or more of the children to remain unexamined each week.

From July to late December 1938, 24 weekly observations were made, with findings as given in table 1. The maximum number of children on the ward was 23; the usual number was 2 to 4 less. In all, 25 infants or young children were studied, and of these, 18 (72 percent) were positive at some time during the period. The routine tests per person varied from 2 (in a debilitated infant who died shortly after admission) to 22. A total of 413 stool specimens was obtained during the routine examinations and 43 (10.7 percent) yielded recognized pathogenic varieties of *Shigella dysenteriae*. In addition, 16 diagnostic specimens were collected from children with diarrheal disorders and 10 (62.5 percent) of these were positive.

There were 25 known infections with *Shigella dysenteriae*, 16 subclinical, and 9 with clinical manifestations. These associated disorders (in all instances due to Sonne), were mild. In 5 there was diarrhea only, with 4 to 6 stools daily; in the others, the only additional symptoms were low-grade fever, loss of appetite, or vomiting. The

[1] From the Division of Infectious Diseases, National Institute of Health, and the DeLamar Institute of Public Health, Columbia University

duration of the illnesses was less than 1 week and commonly 3 or 4 days. There were 6 attacks of diarrhea without related positive cultures. Three of these occurred with upper respiratory infections and 2 others in a young, malnourished infant diagnosed clinically as a feeding problem.

TABLE 1.—*Shigella dysenteriae infections and acute diarrheal disorders in the infant ward of an orphanage July–December 1938*

Age on entering study	Individuals		Fecal cultures		Infections with *Shigella dysenteriae* and reported diarrheal disorders				
	Examined	Positive for *Shigella dysenteriae*	Examined	Positive for *Shigella dysenteriae*	Total infections	Subclinical infections	Infections with related illness	Illness without known infection	Total diarrheal disorders
0–2 months	5	0	43	0	0	0	0	2	2
3–24 months	9	9	188	19	12	5	7	2	9
2–3 years	6	5	92	11	8	6	2	2	4
4 years	5	4	90	13	5	5	0	0	0
Total	25	18	413	43	25	16	9	6	15

The variation in findings by age is also shown in table 1. The 5 infants who were under 3 months of age on entering the study, were culturally negative. One had the two bouts of diarrhea mentioned above. The 9 infants of 3 to 24 months of age had 12 infections, with related symptoms in 7. The 6 children of 2 and 3 years had 8 attacks, with related symptoms in 2 only. The 5 infections in the children of 4 years of age occurred without noted symptoms. In this small series *Shigella dysenteriae* was found with equal frequency in children 3 months old or more, but there was a progressive decrease in related symptoms in older children.

Four known varieties of the *Shigella* group were isolated during the study. Flexner V was found on the initial test and recovered from the same individual on 8 of 9 successive examinations. It was not obtained from any other patient. Later, on August 29th, there was a single isolation of Flexner W. This was the only time this organism was found. Newcastle was identified in 4 of 6 successive examinations of a newly-admitted patient. The Sonne infection (present on the first test) was the only one which spread widely and persistently, infecting 16, and reinfecting 6 of these. It was found on 14 of the 24 weekly examinations, with a maximum of 3 successive weeks with negative findings.

In addition to these accepted "positive" organisms, two other varieties were isolated. On the basis of their biochemical characteristics they would be classified as *Shigella*. The cultural reactions of one of these were consistently those of Flexner strains, but the organisms failed to agglutinate in any of our Flexner antisera. They were isolated on November 15th from 4 individuals and on the following week from 2

different persons. The other strain did not ferment mannite and produced indol. It was not agglutinated by Schmidt's or any other known antisera and remained unclassified. It was isolated 29 times from 15 individuals throughout the period of observation. The presence of these organisms could not be related to the occurrence of diarrheal disorders.

A SCHOOL FOR THE MENTALLY DEFECTIVE

At the request of the Vermont State Board of Health, an investigation was made in a school for the mentally defective in which there had been an outbreak of diarrheal disease. This had occurred in the cottage which housed 58 male low-grade defectives. The majority of these individuals were adolescents, only 7 being under 10 and 6 over 20 years of age. The first case appeared on October 17 and during the next 10 days four additional cases developed. However, from October 27th to November 13th there were 27 new cases. Twelve additional individuals were attacked during the next 3 months. Three of the 44 cases terminated fatally. In the corresponding cottage for females there were two cases in November and three in March. From 4 other cottages there had been reported three cases in November and 1 in March.

Despite the lack of acute cases of enteric disorder when the institution was visited in March 1940, stool cultures were taken from the inmates of the two cottages for the low-grade defectives to determine the prevalence and distribution of *Shigella dysenteriae* infections. On the second visit, 1 month later, all of the 337 inmates of the 6 cottages were cultured. The findings are reported in table 2. Flexner strains only were isolated and with one exception these were the "W" variety. One boy yielded in April an atypical Flexner which was not typed with certainty. The findings do not establish the relationship between the organisms isolated and the outbreak of diarrheal disease. The absence of detected infection among the more normal inmates was in contrast to the observed high prevalence in the very defective individuals.

TABLE 2.—*Stool cultures for Shigella dysenteriae from inmates of a school for the mentally defective*

Groups	First test			Second test		
	Inmates cultured	Positive	Positive for Flexner	Inmates cultured	Positive	Positive for Flexner
		Number	*Percent*		*Number*	*Percent*
Low grade inmates						
Male	50	4	8	48	3	6
Female	67	7	10	68	6	9
Other inmates	- -	- -	- - -	221	0	0
Total	117	11	9	337	9	3

TWO MENTAL HOSPITALS

During the spring and summer of 1940 five series of stool examinations were made on three groups of inmates in the Georgia State Hospital for the insane. One group, A, was selected because they were under especially careful observation by another group of workers, and a more accurate determination of the presence of diarrheal disorders was thus possible. Group B was entirely similar but under routine ward care and group C, examined only three times, was colored, and included to determine if there might be any difference in the two races. All groups were adult females with generally advanced psychoses.

No diarrheal disorders were reported during the period of observation but one patient, on culture, was found to have mushy feces with mucus.

A total of 910 cultures were taken and 19 (2.1 percent) of these yielded some variety of *Shigella dysenteriae* (Flexner) distributed as shown in table 3. Three strains were readily differentiated. All strains isolated from the inmates of group A during the first three examinations and one of the two in September were identical in cultural and serological reactions. Three of the four individuals positive on the first test were also positive on the second or third examination or both. The three organisms found in July in group B were of a second type and these were not encountered at any other time. The remaining five scattered positives in May, July, and September were Flexner W, one of the most commonly encountered varieties.

TABLE 3.—*Stool cultures for Shigella dysenteriae from inmates of a mental hospital in Georgia*

Month	White females				Colored females	
	Group A		Group B		Group C	
	Cultured	Positive	Cultured	Positive	Cultured	Positive
March	72	4	72	0	0	0
April	72	3	72	0	61	0
May	72	3	72	0	59	1
July	72	1	72	3	70	1
September	72	2	72	1	0	0
Total	360	13	360	4	190	2

The second mental hospital, in Puerto Rico, was studied in the spring of 1941. All inmates of five wards were cultured on one occasion only. The findings are given in table 4. Patients similar to those studied in the first hospital were cared for in wards A to D. There were 26 (7 percent) positive specimens in the 389 examined.

Accurate records of minor diarrheal disorders were not available but moderate and severe attacks were known. Two of the infected individuals were reported to have been sick within 1 month prior to examination. In contrast, on the "Dispensary Ward," with 73 patients, 29 (40 percent) were found to be infected, of which 16 had diarrhea when examined and 6 others were reported to have been ill recently.

TABLE 4.—*The occurrence of Shigella dysenteriae infections in five wards of a mental hospital in Puerto Rico*

Group	Individuals examined by single fecal cultures			Variety of *Shigella*				
	Number	Positive for *Shigella dysenteriae*		Flexner				Newcastle
		Number	Percent	V	W	Z	Other	
Ward A—Females	102	7	7	3	1	0	0	3
B—Females	105	3	3	0	0	1	1	1
C—Females	115	5	4	0	0	1	0	4
D—Males	67	6	9	0	3	0	0	3
E [1]—Males	73	26	36	-	14	3	1	8
Total	462	47	10	3	18	5	2	19

[1] A ward used for the care of patients with mild to moderate physical ailments, including diarrheal disorders.

Five varieties of *Shigella dysenteriae* were found, four Flexner and Newcastle. One of these was isolated only from females. The others were distributed in both sections of the hospital.

SUBSEQUENT OBSERVATIONS

Our recent studies of chemotherapy in *Shigella* infections have been conducted largely in institutions. Further data on the subject of this report have accumulated. The high incidence and the multiple varieties of *Shigella* have continued in Puerto Rico. A mental hospital in New York State had *Shigella dysenteriae* infections in epidemic proportions from June through October 1941. Five months later survey cultures revealed that the infection was actively spreading in some wards (with few and mild clinical cases), but in others it was spreading little if at all. A majority of the wards were entirely free of infection. In contrast with this, and with findings reported above, in another New York State hospital and in a school for the mentally defective, diarrheal disease had not been a significant problem for at least 3 years. Survey cultures were obtained from a general sample of the inmates, from a larger sample of the young idiots and the disturbed and unclean patients, also from individuals with recent minor diarrheal disorders. *Shigella dysenteriae* was not found. Some, possibly many, institutions in northern States are maintained free of *Shigella dysenteriae*.

TABLE 5.—*The prevalence of Shigella dysenteriae infections in institutional inmates related to the relative incidence of diarrheal disease in the general population and to the sanitary conditions in the institutions*

Institution	Group(s) examined	Location	Month and year of study	Survey stool cultures			Relative incidence of diarrheal diseases in area served by institution	General sanitary condition in institutions					
				Number	Positive			Water	Milk	Excreta disposal facilities	Flies	Cleanliness	
					Number	Per cent						Environmental	Personal
1 Orphanage	Infants and young children.	New Mexico	June-Dec. 1938	413	43	11	High	Safe public	Pasteurized and canned	Satisfactory	Few	Good	Fair.
2 For mentally defective.	Low grade defectives—Male and female.	New York	June 1939 to Feb 1941	11,117	755	7	Very low	Safe private	Pasteurized	Excellent	Few to none	Excellent	Poor
3 For mentally defective.	(a) Low-grade defectives, (b) High-grade defectives.	Vermont	March and April 1940	(a) 233 (b) 221	20 0	9 0	Very low	Safe public	Raw private	Satisfactory.	None	Satisfactory.	Poor.
4. Mental hospital.	Three wards for females	Georgia	April-Oct. 1940	910	19	2	Medium	Safe public	Private	Poor	Moderate	Fair	Poor.
5. Mental hospital	(a) Four general wards. (b) The dispensary ward.	Puerto Rico	April May 1941	(a) 380 (b) 73	21 26	5 36	Very high	Probably safe public	Canned	Poor	Moderate.	Fair	Poor.

MODES OF DISSEMINATION

The prevalence of *Shigella dysenteriae* infections, as found by the examination of all individuals in the institutional groups studied, varied from 0 to 30 percent. For comparative purposes in table 5 the prevalence is shown in relation to the relative incidence of diarrheal diseases in the respective geographical areas and to the conditions of general sanitation and cleanliness in the institutions.

The prevalence of *Shigella dysenteriae* infection was high in all institutions studied (excluding recent surveys), in spite of the variation in incidence of diarrheal diseases in the general population from which these patients were drawn. In only one instance (Ward E, Mental Hospital II) were the infections concentrated in the group observed, through transferring to it patients with diarrheal disorders.

The water used in four of the five institutions was drawn from a public supply; the one private supply was filtered and chlorinated. In one instance only was its safety open to question. The milk was of satisfactory quality The continuous spread of the infection was strongly against this or any other article of food being responsible for the dissemination of these infections. Excreta disposal in all institutions was by flush toilets, but these were inadequate in number in both mental hospitals. Flies were very rare in the two institutions for the mentally defective and were common only in Mental Hospital II. In their absence the infections spread readily.

The general cleanliness of the environment was excellent in the New York institution for mental defectives where a high prevalence of *Shigella dysenteriae* was observed. It was good in the orphanage and the school for the mental defectives but only fair in the two mental hospitals. A portion of the individuals examined gave some care to personal cleanliness. Many of them, particularly the low-grade mental defectives, those with advanced psychoses, and the young children in the orphanage frequently soiled themselves and their environment with feces. Person-to-person transfer of fecal pollution could occur easily in all of these institutional groups.

SUMMARY

(1) The prevalence of *Shigella dysenteriae* infection among institutional inmates was determined by 13,356 survey stool cultures, of which 885 (6.6 percent) were positive.

(2) The prevalence in the same group at different times was found to vary from no detected infections to a maximum of 26 percent known infected at one time.

(3) The detected infections in different groups varied from none to a maximum of 36 percent positive at one time.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JULY 18, 1942

Summary

The incidence of meningococcus meningitis continues high for this season of the year. For the current week it is nearly twice as high as the 5-year (1937–41) median and higher than for the corresponding week of any other year since 1937. A total of 63 cases was reported currently, as compared with 61 cases for the preceding week. The largest numbers of cases are still occurring in the eastern States. The New England States (10), Middle Atlantic (17), South Atlantic (9), and East South Central States (8) reported 70 percent of the current total. Missouri, with 7 cases, was the only State outside these areas which reported more than 3 cases for the week.

A total of 83 cases of poliomyelitis was reported, as compared with 59 last week and a 5-year median of 143. The highest incidence is in the South Central States, which reported 38 cases, and the East North Central States, which reported 16 cases Kentucky reported 17 cases (2 for the preceding week), and Arkansas reported 11 (12 for each of the two preceding weeks).

Of 16 cases of smallpox (9 last week, 13 for the corresponding week last year), 7 cases occurred in Tennessee.

Other reports include 6 cases of anthrax (2 each in Pennsylvania and Texas, and 1 each in Maine and Louisiana), 356 cases of bacillary dysentery (261 in Texas), 386 cases of unspecified dysentery (351 in Virginia), 17 cases of amebic dysentery, 13 scattered cases of infectious encephalitis, 17 cases of Rocky Mountain spotted fever (of which only 3 were in the northwestern Mountain States, 27 cases of tularemia, and 58 cases of endemic typhus fever (26 in Texas, 10 in Georgia, and 9 in Alabama).

The death rate for the current week in 88 large cities of the United States is 11.0 per 1,000 population, as compared with 10.6 for the preceding week and a 3-year (1939–41) average for the week of 10.2. The accumulated rate to date this year is 12.0, as compared with 12.2 for the corresponding period last year, when a record low rate of 10.5 for the entire year was reported by the Bureau of the Census.

Telegraphic morbidity reports from State health officers for the week ended July 18, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median, 1937-41	Week ended		Median, 1937-41,	Week ended		Median, 1937-41,	Week ended		Median, 1937-41
	July 18, 1942	July 19, 1941		July 18, 1942	July 19, 1941		July 18 1942	July 19, 1941		July 18, 1942	July 19, 1941	
NEW ENG.												
Maine	0	0	1	---	---	---	36	68	50	2	0	0
New Hampshire	0	0	0	---	---	---	3	6	6	0	0	0
Vermont	0	0	0	---	---	---	71	25	25	0	0	0
Massachusetts	8	1	3	---	---	---	232	307	307	4	0	1
Rhode Island	2	1	0	---	---	---	41	13	13	2	0	0
Connecticut	0	3	3	---	2	2	75	117	51	2	0	0
MID. ATL.												
New York	9	11	21	[1] 3	[1] 1	[1] 3	368	491	615	9	4	3
New Jersey	5	3	6	2	---	---	170	251	247	2	0	0
Pennsylvania	12	2	15	1	---	---	121	679	480	6	2	2
E. NO. CEN												
Ohio	4	7	7	12	5	4	64	250	233	0	0	1
Indiana	3	2	6	1	13	12	16	23	10	0	2	2
Illinois	14	15	17	9	7	7	51	106	106	1	1	1
Michigan [2]	2	3	6	1	1	---	42	253	241	1	0	1
Wisconsin	0	1	2	12	9	9	352	373	373	0	0	0
W. NO. CEN												
Minnesota	0	1	1	1	2	1	54	6	23	0	0	0
Iowa	0	1	2	---	1	1	45	31	53	0	0	0
Missouri	0	3	4	1	---	---	31	49	15	7	0	0
North Dakota	1	1	1	---	---	---	9	8	8	1	0	0
South Dakota	1	5	1	---	---	---	8	2	2	0	1	0
Nebraska	2	0	1	5	3	---	55	7	8	0	0	0
Kansas	2	1	2	3	1	1	33	44	21	0	0	0
SO. ATL.												
Delaware	0	0	0	---	---	---	1	4	2	0	0	0
Maryland [3]	1	0	2	1	1	2	40	181	27	2	5	1
Dist. of Col.	2	0	5	---	---	---	13	30	30	1	0	0
Virginia	5	1	11	76	36	17	24	82	65	2	0	4
West Virginia	2	3	3	1	1	7	23	65	41	1	1	1
North Carolina	4	7	7	---	1	1	31	176	86	0	0	2
South Carolina	8	3	3	67	78	69	8	116	8	1	0	1
Georgia	4	3	3	7	11	9	20	73	9	1	1	1
Florida	2	3	3	4	9	---	34	6	10	1	0	0
E. SO. CEN.												
Kentucky	0	4	4	---	---	---	8	49	24	3	2	2
Tennessee	2	0	3	4	12	12	15	67	25	0	0	0
Alabama	4	3	5	3	3	9	16	41	23	3	3	3
Mississippi [2]	6	1	3	---	---	---	---	---	---	2	0	0
W. SO. CEN.												
Arkansas	4	3	5	2	15	5	12	57	23	0	2	2
Louisiana	2	5	4	4	1	11	11	1	3	1	1	1
Oklahoma	3	2	3	10	16	7	2	11	14	0	0	0
Texas	13	22	22	106	348	87	52	103	103	3	0	0
MOUNTAIN												
Montana	0	2	1	4	1	---	31	6	8	0	0	0
Idaho	1	0	0	---	---	---	2	2	3	0	0	0
Wyoming	0	0	0	13	---	---	34	3	2	0	0	0
Colorado	1	11	9	34	5	---	40	24	29	1	0	0
New Mexico	0	1	0	1	---	---	2	17	17	0	0	0
Arizona	0	0	2	9	25	18	42	49	14	0	1	0
Utah [3]	0	0	0	---	2	---	169	8	32	1	0	0
Nevada	0	0	---	---	---	---	5	1	---	1	0	---
PACIFIC												
Washington	0	0	0	---	---	---	188	8	22	0	0	0
Oregon	2	0	0	6	1	4	43	30	30	0	0	0
California	10	13	16	28	30	16	512	146	146	2	0	1
Total	141	148	242	431	641	387	3,255	4,555	3,912	63	26	34
28 weeks	6,619	6,673	10,666	78,995	486,582	157,903	458,682	813,955	342,249	2,143	1,271	1,271

See footnotes at end of table.

PLAGUE INFECTION IN CALIFORNIA AND OREGON

Plague infection has been reported proved in specimens collected in California and Oregon as follows:

CALIFORNIA

Kern County: April 30, in a pool of 200 fleas from burrows of ground squirrels, *C. beecheyi*, and in a pool of 28 fleas from 3 ground squirrels, same species, taken 1 mile south of California State Institution for Women; May 6, in a pool of 276 fleas from 34 ground squirrels, also *C. beecheyi*, taken 1 mile east of Lebec, Castac Lake area.

Lassen County: May 31, in a pool of 120 fleas from a burrow of ground squirrels, *C. beldingi*, 3 miles south and 9 miles east of Amedee; June 20, in a pool of 22 fleas from 43 ground squirrels, *C. oregonus*, taken 2 miles north and 2½ miles west of Janesville.

Monterey County: In tissue from ground squirrels, *C. beecheyi*, as follows: May 14, in a pool of tissue from 5 ground squirrels taken 3 miles northeast of Lockwood, and May 15, in a pool of tissue from 3 ground squirrels from the same location. In pools of tissue and ectoparasites from ground squirrels, *C. beecheyi*, taken on the Fort Ord Military Reservation, 12 miles southwest of Salinas, as follows: June 13, 180 fleas from 15 squirrels and tissue from 15 squirrels; June 18, 27 fleas from squirrel burrows, 103 fleas from 11 squirrels, and 118 fleas from 18 squirrels; June 19, 113 fleas from 21 squirrels and 200 fleas from 14 squirrels; June 20, 72 fleas from 9 squirrels and organs from 1 squirrel; June 22, 112 lice from 19 squirrels and 175 fleas from 19 squirrels.

Placer County: June 20, in a pool of 9 fleas from 4 chipmunks taken at Talawanda Girls Camp, ½ mile north of Tahoe Vista.

Siskiyou County: In pools of tissue and ectoparasites from ground squirrels, *C. douglasii*, as follows: June 3, tissue from 7 squirrels taken 4 miles north of Montague; June 11, 200 fleas from 22 squirrels taken ½ mile north of Hilt; June 12, 122 fleas from 5 squirrels taken 4 miles east and 1 mile north of Yreka, 132 fleas from 5 squirrels taken 1 mile south and 1 mile east of Yreka, and 91 fleas from 3 squirrels taken 1½ miles east of Yreka; June 17, 198 fleas from 20 squirrels taken at Montague Airport, 1¼ miles west of Montague, and 74 fleas from 6 squirrels taken 4 miles east of Yreka.

Ventura County: June 16, in a pool of 311 lice from 21 ground squirrels, *C. beecheyi*, taken 1 mile east and 1 mile north of Oxnard, and a pool of 96 lice from 9 ground squirrels, same species, from the same location; June 23, in a pool of 253 fleas from 4 ground squirrels, *C. beecheyi*, taken 5 miles northeast of Santa Paula.

OREGON

Malheur County: June 9, in a pool of 1 flea and 10 lice from 9 ground squirrels, *C. mollis*, taken 2 to 6 miles north of McDermott on Highway No. 95.

Harney County: June 19, in a pool of 89 fleas from 161 ground squirrels, *C. oregonus*, taken 13 to 18 miles southeast of French Glen (Fish Lake).

WEEKLY REPORTS FROM CITIES

City reports for week ended July 4, 1942

This table lists the reports from 90 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	1	0		0	0	0	2	0	2	0	0	2
Baltimore, Md	1	0	3	2	21	2	7	0	8	0	1	35
Barre, Vt	0	0		0	0	0	0	0	0	0	0	4
Billings, Mont	0	0		0	10	0	1	0	0	0	0	2
Birmingham, Ala	0	0		1	4	0	1	0	0	0	0	4
Boise, Idaho	0	0		0	4	0	0	0	0	0	0	0
Boston, Mass	0	0		0	65	0	3	0	20	0	1	32
Bridgeport, Conn	0	0		0	1	0	1	0	2	0	0	0
Brunswick, Ga	0	0		0	0	0	0	0	0	0	0	0
Buffalo, N Y	0	0		0	20	1	5	0	3	0	0	6
Camden, N J	1	0		0	0	0	1	0	1	0	0	10
Charleston, S C	0	0	1	0	1	0	1	0	0	0	1	0
Charleston, W Va	0	0		0	0	0	0	0	0	0	1	0
Chicago, Ill	16	0	1	1	16	0	25	1	34	1	1	166
Cincinnati, Ohio	0	0		1	1	0	1	0	4	0	0	7
Cleveland, Ohio	0	0	1	1	3	0	3	0	16	0	1	31
Columbus, Ohio	1	0	1	1	19	0	1	0	3	0	0	12
Concord, N H	0	0		0	3	0	0	0	2	0	0	0
Cumberland, Md	0	0		0	0	0	0	0	1	0	0	0
Dallas, Tex	1	0		0	1	0	3	0	2	0	0	11
Denver, Colo	6	0	3	0	26	0	2	0	0	0	0	13
Detroit, Mich	1	0		0	17	0	5	0	32	0	0	65
Duluth, Minn	0	0		0	2	0	0	0	6	0	0	0
Fall River, Mass	5	0		0	6	0	0	0	9	0	0	2
Fargo, N Dak	0	0		0	0	0	0	0	0	0	0	0
Flint, Mich	0	0		0	0	0	2	0	1	0	0	4
Fort Wayne, Ind	0	0		0	0	0	1	0	0	0	0	3
Frederick, Md	0	0		0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0		0	0	0	2	0	0	0	0	2
Grand Rapids, Mich	0	0		0	0	0	0	2	1	0	0	5
Great Falls, Mont	0	0		0	5	0	0	0	1	0	0	1
Hartford, Conn	0	0		0	26	0	1	0	1	0	0	4
Helena, Mont	0	0		0	2	0	0	0	0	1	0	0
Houston, Tex	2	0		0	1	0	10	0	1	0	1	11
Indianapolis, Ind	1	0		0	15	0	0	1	4	0	0	8
Kansas City, Mo	0	0		1	15	0	2	0	3	0	2	9
Kenosha, Wisc	0	0		0	8	0	0	0	0	0	0	10
Little Rock, Ark	0	0		0	0	0	1	0	0	0	0	0
Los Angeles, Calif	3	0	4	0	131	1	3	0	14	0	1	10
Lynchburg, Va	0	0		0	1	0	0	0	0	0	0	4

See footnotes at end of table.

City reports for week ended July 4, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Memphis, Tenn.	0	0	------	0	13	0	1	2	1	0	0	9
Milwaukee, Wisc.	0	0	1	1	332	0	6	0	15	0	0	46
Minneapolis, Minn.	2	0	------	0	11	1	1	0	5	0	1	2
Missoula, Mont.	0	0	------	0	0	0	0	0	2	0	0	0
Mobile, Ala.	0	0	------	0	0	0	1	0	1	0	1	0
Nashville, Tenn.	0	0	------	0	0	0	0	0	0	0	0	3
Newark, N. J.	1	0	1	0	47	0	2	0	12	0	0	25
New Haven, Conn.	0	0	------	0	13	0	1	0	0	0	0	14
New Orleans, La.	1	0	2	0	7	0	8	0	1	0	5	0
New York, N. Y.	13	2	3	0	39	5	34	1	67	0	0	194
Omaha, Nebr.	0	0	------	0	6	0	1	0	0	0	0	0
Philadelphia, Pa.	2	0	------	0	26	0	15	0	50	0	3	83
Pittsburgh, Pa.	1	0	------	0	5	1	5	0	7	0	0	19
Portland, Me.	0	0	------	0	20	0	2	0	1	0	0	1
Providence, R. I.	0	0	------	0	43	0	0	0	2	0	1	43
Pueblo, Colo.	0	0	------	0	2	0	2	0	0	0	0	0
Racine, Wisc.	0	0	------	0	40	0	0	0	4	0	0	18
Raleigh, N. C.	0	0	------	0	2	0	0	0	0	0	0	1
Reading, Pa.	0	0	------	0	0	0	0	0	0	0	0	19
Richmond, Va.	0	0	------	0	2	0	0	0	0	0	1	1
Roanoke, Va.	0	0	------	0	0	0	0	0	0	0	0	0
Rochester, N. Y.	0	0	------	0	3	0	0	0	4	0	0	7
Sacramento, Calif.	0	0	------	0	3	0	1	0	2	0	0	13
Saint Joseph, Mo.	0	0	------	0	0	0	0	0	0	0	0	0
Saint Louis, Mo.	0	0	------	0	12	0	8	0	5	0	0	7
Saint Paul, Minn.	0	0	------	0	19	0	3	0	1	0	0	20
Salt Lake City, Utah	0	0	------	1	95	0	2	0	1	0	0	9
San Antonio, Tex.	0	0	------	0	0	0	2	0	1	0	0	3
San Francisco, Calif.	0	0	------	0	137	2	7	0	3	0	0	2
Savannah, Ga.	0	0	2	0	0	0	0	0	0	0	0	7
Seattle, Wash.	1	0	------	1	195	0	1	0	0	0	0	12
Shreveport, La.	0	0	------	0	0	0	0	0	0	0	0	0
South Bend, Ind.	0	0	------	0	3	0	0	0	0	0	0	4
Spokane, Wash.	0	0	------	0	68	0	2	0	1	0	0	5
Springfield, Ill.	0	0	------	0	0	0	0	0	0	0	0	0
Springfield, Mass.	0	0	------	0	17	0	3	0	4	0	0	3
Superior, Wis.	0	0	------	0	2	0	0	0	1	0	0	0
Syracuse, N. Y.	0	0	------	0	232	1	0	0	0	0	2	20
Tacoma, Wash.	0	0	------	0	41	0	0	0	0	0	0	6
Tampa, Fla.	0	0	------	0	4	0	1	0	1	0	0	0
Terre Haute, Ind.	0	0	------	0	0	0	1	0	0	0	0	0
Topeka, Kans.	0	0	------	0	4	0	3	0	0	0	0	2
Trenton, N. J.	0	0	1	1	0	0	1	0	2	0	0	9
Washington, D. C.	0	0	------	0	25	0	6	0	1	0	0	22
Wheeling, W. Va.	0	0	------	0	0	0	0	0	1	0	0	9
Wichita, Kans.	0	0	------	0	6	0	3	0	1	0	0	3
Wilmington, Del.	0	0	------	0	3	0	1	0	0	0	1	1
Wilmington, N. C.	0	0	------	0	1	0	1	0	0	0	0	10
Winston-Salem, N. C.	0	0	------	0	3	0	0	0	0	0	0	2
Worcester, Mass.	0	0	------	0	1	1	6	0	11	0	0	46

Anthrax.—Cases: New Orleans, 1.
Dysentery, amebic.—Cases: Los Angeles, 1; New York, 2.
Dysentery, bacillary.—Cases: Columbus, 1; Los Angeles, 1; Memphis, 1; Nashville, 1; New York, 1, Richmond, 1; San Francisco, 1; Shreveport, 1.
Rocky Mountain Spotted Fever.—Cases: Baltimore, 1; Great Falls, 1; Richmond, 1.
Typhus Fever.—Cases Birmingham, 1; Charleston, S. C., 2; Houston, 1. Nashville, 1.

Rates (annual basis) per 100,000 population, for the group of 90 cities in the preceding table (estimated population, 1942, 34,134,198)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended July 4, 1942	9.17	3.67	1.83	291.16	32.84	57.90	0.31	3.82	179.19
Average for week, 1937-41	12.04	4.48	2.01	[1] 330.23	41.84	93.87	0.93	5.56	197.15

[1] Median.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended June 20, 1942.—During the week ended June 20, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			2	1	3			2	1	9
Chickenpox		7	2	171	248	32	8	16	56	540
Diphtheria		18	2	19		5	4		1	49
Dysentery				18						18
German measles			1	8	46	6	7	5	30	103
Influenza		3			2		1		3	9
Lethargic encephalitis		1				1				2
Measles		1	1	238	307	52	10	10	8	627
Mumps		19		95	393	39	138	10	324	1,018
Pneumonia		7			4	2	1		6	20
Poliomyelitis			1			1		1		3
Scarlet fever	1	15	14	74	152	26	23	43	[illegible]2	390
Tuberculosis	2	1	10	90	51				50	204
Typhoid and paratyphoid fever			1	18	1					20
Undulant fever					1				1	2
Whooping cough			2	172	57				37	268
Other communicable diseases		8		5	282	28	2		5	330

Province of Alberta—Plague infection in ectoparasites.—Under date of July 21, 1942, plague infection, demonstrated bacteriologically, was found in 3 flea specimens taken from ground squirrels collected, respectively, 6 miles north of Stanmore, at Sunnybrook, and 10 miles north of Sunnybrook.

CHILE

Cerebrospinal meningitis.—According to information received, a total of 666 cases of cerebrospinal meningitis have been reported in Chile up to July 9, 1942, when there were still 180 cases in Santiago and 60 in Valparaiso, Chile.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Peru.—During the month of May 1942, plague was reported in Peru, by Departments as follows: Lima, 13 cases, 4 deaths (Lima city, 12 cases, 4 deaths); Piura, 1 case, 1 death.

Typhus Fever

Bulgaria.—During the week ended June 20, 1942, 10 cases of typhus fever were reported in Bulgaria. For the preceding week, 7 cases of typhus fever were reported.

Irish Free States—Mayo County—Westport.—Information dated June 10, 1942, states that for the period April 24, 1942, to May 18, 1942, a total of 5 cases of typhus fever with 2 deaths were reported in Westport Urban District, Mayo County, Irish Free State.

Morocco.—During the week ended June 20, 1942, 820 cases of typhus fever were reported in Morocco.

Rumania.—During the week ended July 4, 1942, 19 cases of typhus fever were reported in Rumania. During the week ended June 27, 1942, 22 cases were reported.

Yellow Fever

British East Africa—Kenya.—On May 15, 1942, 1 fatal case of yellow fever was reported in Kitale, Kenya, British East Africa.

Gold Coast—Kibi.—On June 13, 1942, 1 suspected case of yellow fever was reported in Kibi, Gold Coast.

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COURT DECISION ON PUBLIC HEALTH

Milk—prohibition of sale in city when pasteurized outside of county in which city is located.—(Texas Court of Civil Appeals; *Prescott* v. *City of Borger et al.*, 158 S. W. 2d 578; decided January 12, 1942, rehearing denied February 9, 1942.) In 1940 the commission of the city of Borger enacted an ordinance which in substance provided that no milk or cream should be sold in the city that had been pasteurized outside of Hutchinson County, in which the city was located, except as might be authorized by the city health officer. When the ordinance was passed the plaintiff was engaged in the business of selling and distributing grade A pasteurized milk in Borger. He neither produced nor pasteurized the milk he sold but procured it at wholesale prices from a creamery located in Potter County and sold it to his customers in Borger in the bottles in which it had been placed by the creamery. The plaintiff brought suit against the city and its mayor and other officials for an injunction against the enforcement of the ordinance, alleging that the ordinance was invalid and unenforceable.

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MENTAL HYGIENE SERVICES IN RURAL AREAS

The Program of the Mental Hygiene Division, Suffolk County Department of Health, New York

By George M. Lott, M. D., *Director*

Provision for Mental Hygiene services in rural areas has long been a pressing need. Some States and localities have made a variety of approaches to the problem.[1] It is necessary to draw a distinction between a scientific survey of a small county [2] and the operation of a clinic rendering public service in a widespread area of scattered population. This discussion refers to the experience of a child guidance or mental hygiene unit operating as a division of the Suffolk County Department of Health. It is believed that this is the first county health department in the United States to organize and finance such a clinical service. It represents a forward step in that it is a formal recognition of the importance of the conservation of emotional health as a definite part of a public health program.

Suffolk County.—Suffolk County has a population of 175,000, distributed irregularly in an area ranging up to 20 miles wide and about 80 miles long. It is located on the eastern end of Long Island. The eastern half of the county is made up of two peninsulas. The people are mostly the descendants of the original Yankee settlers, with a recent mixture of Polish and some other European nationalities. Industries are for the most part truck farming and fishing, with a few small manufacturing centers. Many localities have a large number of summer homes of people from the nearby metropolitan center.

Preliminary survey of needs.—The preliminary approach to the problem has been to seek out and meet as much as possible the special mental hygiene and psychiatric needs of the social agencies and communities. The impetus for the formation of the county's own clinic came from multiple sources. The Juvenile Court Judge felt that many cases coming before him should have had much earlier expert attention. A survey of guidance in Suffolk County was made in

[1] Psychiatric Clinics for Children (with special reference to State programs). Witmer, Helen L. Commonwealth Fund

[2] Williamson County Child Guidance Study, Tennessee, operates as a unit of the State Department of Health, and was financed by the Rockefeller Foundation.

1938 by the New York State Committee on Mental Hygiene at the request of the County League of Women Voters. The County Council of Social Agencies had completed a study of the requirements (jobs, recreational facilities, and vocational and child guidance) and social service resources. A Directory of Social Agencies was pub lished by the County Council. These surveys and our own investigations pointed out the need for more psychiatric consultation and child guidance services among the 35,000 school children and to the various social agencies and rural communities.

Social resources.—The county social agencies comprise the Board of Child Welfare, the Probation Department, and the various divisions of the Department of Public Welfare. The Board of Child Welfare alone has supervision of over 1,500 children, about 600 of whom are in foster homes. The Probation Department handles about 900 cases a year. Over one-third of these are new cases, of which about one-fifth are juveniles under the age of 16. The Department of Public Welfare encounters a variety of personality problems needing specialized consultation service. Multiple social agency functions are performed by the 29 public health nurses (23 full-time and 6 employed jointly with the American Red Cross) of the health department. In some of the more populous localities there are a few private social agencies. Some boys' clubs are available and Boy Scout organizations are widespread. A summer camp for undernourished children is provided by the welfare department. It can therefore be seen that the county has some social resources and is more fortunate in this respect than many rural areas.

Medical resources.—The medical facilities of the county are well organized and readily available. A close-working relationship has been worked out by the medical society and the welfare departments with the local physicians, who carry out all medical and surgical treatment. Practically every family in the county is able to have its own family physician, who is either paid privately or, in the case of relief families, by the Department of Public Welfare. The County Infirmary, the former Old Folks Home, has been placed on the status of a modern hospital. Six private general hospitals are so situated that they are within convenient reach of most areas. There are also a number of private sanitariums, two of which are for psychiatric cases. The county tuberculosis sanitarium, which is operated under the supervision of the health department, provides traveling tuberculosis clinics. Traveling orthopedic clinics are also held under the supervision of the health department. One public health nurse devotes her entire time to orthopedic cases. The health department has recently employed a full-time nutritionist, after a successful one-year demonstration of such community educational work.

Aims.—After due consideration of the local situation, with its existing resources and apparent needs, the following general aims were tentatively formulated: (1) Further searching out of local needs and devising of constructive ways of meeting them will tend to keep the Division's program flexible and practical. (2) Every effort should be made to conserve time for the essential corrective follow-up and treatment of remediable problems. (3) The development of close co-operation with the local medical profession, by consultation with them on clinic cases, results in more complete diagnoses and more adequate treatment facilities. (4) The primary aims, for the prevention of emotional maladjustment and the promotion of more integrated character formation, can be best accomplished by emphasizing work with children and school groups. (5) An adequate educational program in the principles of child guidance and mental hygiene should further preventive and corrective procedures.

Organization.—The Mental Hygiene Division of the health department was established November 1, 1940 and began operation on April 1 with the appointment of the Director on May 1, 1941. By the end of 4 months the preliminary organization period was completed. The clinical staff is composed of the typical child guidance unit, namely, a psychiatrist, a psychologist, two psychiatric social workers, and a secretary. The psychiatric social worker uncovers the life story leading up to the presenting problem behavior exhibited by the person to be examined. Not only the personal history but also a knowledge of the personalities and attitudes of the family or key associates usually are important in understanding the development of the difficulty. The physical condition, intelligence level, aptitudes, assets, liabilities, and character make-up, as determined by the psychologist and psychiatrist, are then seen in the setting in which they developed. The understanding thus gained furnishes leads as to the advisable corrective and treatment procedures.

Initial program.—A tentative program has been developing during the last year. Clinic service has been rendered on 250 cases. In addition, about 500 school children have been surveyed by group-testing methods as a demonstration project. Therefore, what follows is in the nature of a progress report. The unit was set up to serve the Juvenile Court, the county welfare agencies, and those schools and communities which did not have such services. The State mental hygiene traveling clinics of the three State mental hospitals, which are situated in the western end of the county, have for a number of years been giving the equivalent of more than a week's service a month. The health department unit is responsible for all Juvenile Court cases, while the State hospital clinics care for all school cases in the areas of their traveling clinic locations. This division of duties has

aided the health department clinic to emphasize also needed service to schools in the outlying rural districts. The cases are for the most part referred by a social agency worker or a school nurse, who usually prepares the preliminary history. When the case is brought in for examination, our psychiatric social workers interview the parents, teachers, and others who may accompany the child so that more detailed history material is obtainable. An evaluation of key persons in the environment is also possible. After the examination, a formal or informal conference is attended by those who will have to participate in the plans for treatment. A formulation of the problem is made and the responsibility for carrying out the definite parts of the program is allocated. It has been relatively easy, therefore, to accomplish an amount of follow-up advisory treatment.

First 200 cases.—The first 200 cases showed a proportionate even distribution of the clinical work among the various groups served by the Division. One-fourth were examined for the Juvenile Court and Probation Department. Another one-fourth were referred by the county social agencies. The other half were studied for the schools and family physicians. Roughly, two-thirds of the total were school children. Eleven and one-half percent were educational or learning disabilities, the correction of which is very important. Only 14½ percent were found to be mentally deficient. Psychotic cases uncovered amounted to 4½ percent. Six percent were neurotic. Five percent had evidences of major physical defect. Thirty-three percent were behavior and social problems.

Methods of rendering service in a rural area.—In a rural area many special conditions require solution. Adequate follow-up and provision for direct treatment of cases needing the same are two of the great problems. The main working center in the health department office is now geographically centrally located. Distances are great and traveling is often difficult to arrange. In order partially to meet this situation a series of traveling clinics to different parts of the county has been inaugurated. In this way traveling distances of clients are shortened and the possibilities for closer cooperation have been enhanced. Motor transportation for the staff is provided by the health department

Modification of services to meet wider needs.—Those familiar with mental hygiene and child guidance clinics are acquainted with the difficulty of covering a large number of cases with adequate service. Modifications of the usual procedure have been and are being experimented with to meet wider local needs. A consultation service on individual problems and on social case work techniques is being developed by our psychiatric social workers and has been greatly appreciated by the local agency workers. A similar service on educational

problems is being rendered by the psychologist. The usual psychiatric consultations are furnished by the psychiatrist. These individual special services, given by the various staff members, are coordinated with the general program by the Director. Special problems are routinely discussed The combined contributions of psychiatry, psychology, and social work can be applied to each case as needed. Managed in this manner, the handicaps encountered by each specialist when working entirely alone are avoided. There is no need of attempting the solution of problems beyond the individual's skill or training.

Clinical service is basis of preventive educational program.—In general the program has developed along both clinical and educational lines. A series of informative talks and locally published articles has been utilized as well as some agency staff instruction. The importance of a clinical service to act as a basis for the educational program cannot be overemphasized. Clinical service makes the educational program concrete and real. We have found that it has been possible to an unusual extent to utilize the clinical work as a very practical educational procedure. This has been accomplished by the use of the initial case conferences, which are attended by the referral agency workers, interested principals, teachers, physicians, nurses, clergy, and others. The visitors sit in with the psychiatrist, psychologist and the psychiatric social workers while the case findings are reviewed. The medical, psychological, and mental hygiene and child guidance principles illustrated by a particular case can be clearly and interestingly brought out. All then participate in the formation of a practical treatment program, and responsibility for its various elements are allocated. Usually the social agency worker carries out the recommendations. In some instances several departments need to cooperate in working out the treatment program. At times the clinic staff assists in treatment when especially difficult problems are encountered. Frequently relatives and even patients have been interviewed in the conference, thus providing demonstrations of some techniques for the benefit of the agency workers in attendance. The mental hygiene principles and techniques illustrated may be thus acquired by those key individuals in the community, who have the opportunity to do preventive and early corrective work while handling more constructively the larger groups under their care. In this way our Division is in some measure meeting the much talked of need for preventive mental hygiene activities.

Case example illustrating mental hygiene principles.—The study of one 7-year-old boy illustrated multiple unwise parental influences and indicated the application of a variety of child guidance principles. He was failing in the first grade, was extremely childish, soiled, cried easily, and constantly demanded attention. Occasionally he was

enuretic and refused to eat. There was much fighting with his brothers and sisters. His physical development and nourishment were poor. He complained of stomach pains when forced to eat. The mother was found to have excessive anxieties, fears, and hidden adverse attitudes (unwanted pregnancy) toward this son. Her anxieties were increased by the death of her next-born and compelled her to exert multiple pressures on the child. The boy was extremely childish for his age and had become fearful and negativistic. Investigation revealed the following usual methods of mismanagement which tend toward the development of an emotional cripple: (1) He was dressed on school days; (2) he was kept in, (3) he was watched constantly, often with impatience, and was frequently spanked; (4) he was allowed to eat between meals, thus interfering with his natural appetite, and was then forced to eat at meal times; (5) a condition of chronic constipation was induced by the use of glycerine sticks; (6) he was compared adversely with his brothers and sisters in their presence; (7) the mother lay down with him "to get him to go to sleep at bed time"; (8) as a result of the impatience and spankings which accompanied the parents' tutoring, he developed a dislike for books.

The mother was led into a receptive frame of mind and helped to think through her problems. After being encouraged to express her opinions, she was able to say about the boy, if he was lonesome and wanted attention, "He plays sick. He does something to get in my way. He asks me questions. He asks me to undress him or play games with him. I promise to do it at a certain time." "Yes, it is possible he does not eat if he wants me to be with him. It makes me impatient." The mother could understand the value of paying attention to and playing with this boy when he was good, ignoring the undesirable behavior so as to discourage it. With nothing between meals and no urging to eat, his natural appetite would become an ally. Feeding and urging could be safely omitted. The teaching could be better left to the school. He could dress himself on school days as well as on holidays. There was much to indicate that the mother's patterns and attitudes were fixed, but she was receptive to authoritative advice.

Case conferences promote interagency cooperation.—It can also be readily seen that our conferences may become the focal point for the efficient correlation of case work procedures of the various social agencies, even including those departments which render relief aid. An illustration will bring this out clearly. An adult woman was being carried on relief. She was constantly complaining of exaggerated physical symptoms and sought admission to many different hospitals. Her emotional, unstable, and very annoying behavior made it difficult to provide for her care in a community home. She

was constantly taking up the time of staff members of the five social agencies which were involved in her care. She made unwarranted complaints and was litigious. She had been repeatedly seeking help from a number of physicians. The conference was attended by representatives of the Department of Public Welfare, the Division of the Blind, the County Infirmary, the Board of Child Welfare (who had to look after her children), and of the Probation Department (non-support case). After the various items of information in possession of each agency became the common knowledge of all, the nature of the problem became quite clear. She required hospitalization and psychiatric care. Curiously enough, the patient herself was very willing to accept such treatment.

Possibilities of prevention through child care agencies.—We have considered that portion of our program devoted to the foster home placement agency, the Board of Child Welfare, and the educational work with their staff members to have an especially important bearing on the avoidance of later maladjustments. Successful foster home placement demands understanding of the needs of children and of the important relationships which are inherent in any home setting. Consequently, our child guidance service can be of special assistance to such a children's agency, which has an opportunity to do so much preventive work. An example of such aid is worthy of mention. A 10-year-old girl, who had been an orphan since the age of 2, was showing problem behavior in the foster home where she had been placed. It was said that she was forgetful, untidy, tore her clothes, stole, and had shaky, nervous spells. The history revealed that she had been cared for in orphanages until 6½ years of age. There the youngster had been conformative, but timid, frail, and shy. Then for several years she lived unhappily with her grandparents, whom the neighbors felt neglected and mistreated the child. Study showed that the complaints were exaggerated by the foster mother, who had a well-ordered, nice home, but was rigidly neat, over-particular, fussy, and intolerant of ordinary childish behavior. The stealing was confined to taking cookies and sweets from the kitchen. Examination revealed an inhibited, tearful, attractive girl, who presented an over-conscientious, self-critical attitude with a great desire to please and be loved. When scolded she became tense and a little tremulous, the aftermath of an attack of St. Vitus' dance at the age of 6. This youngster needed a feeling of stabilizing security and could come happily out of her shell in a suitable placement in a warm, tolerant home. The character and attitude of the adults and the atmosphere in a prospective boarding foster home for children need skilled evaluation. The physical characteristics of the home, important as they are, are only one factor in selecting suitable abodes.

Prevention and correction through the schools.—Early in our program a decision was made to devote much time to school children, where by and large the most worthwhile corrective and preventive work is possible. Two-thirds of the cases have been school children with problems. They include personality and behavior disorders, which at this age are more often remedial, as well as poor progress in one or more school subjects.

Emotional disorder can interfere with educational achievement.—The diagnosis and treatment of an emotional disorder, which interfered with educational achievement, are illustrated by the case of a shy 9-year-old girl. In spite of good intelligence, normal vision, and adequate physical health, she had always been poor in spelling and reading, and failed the fourth grade. Shyness, crying easily, and timidity about reciting were also present. Formal tests indicated that her educational achievement in reading and other tool subjects was equal to her grade. Why, then, did she have trouble with reading? She was an only child whose parents had separated 3 years previously. The mother was stable, but said she had done too much for her daughter. The mother said the father had been unable to complete college and was very concerned about his daughter's education. When the girl first went to school he urged her to study and tutored her. He became impatient, derogatory, and punitive when she made a mistake. When the child was interviewed her spontaneous thoughts indicated that reading and association with authoritative adults gave rise to a feeling of vague, inhibiting fear. Her headaches occurred, "When I look at a book so hard. I put it close to my eyes when there are big hard words." "My father would whip me when he helped me with my school work. I read with him. I was very small and so I don't remember much about it." In answer to a question she said, "No, it is not hard to read, but I don't like it. I just don't know why." Concerning school she said, "I like it some. I don't like it, but I kinda' like it." Later, when she was asked what things scared her, she denied present fears, but added, "Sometimes when I read I get scared." She began to comprehend why books made her have a fearful feeling.

It was clear that the shyness, timidity, hesitancy and reading difficulty were emotional character handicaps. They arose at an early age when she was tutored by an impatient, severe father. Then she had been emotionally conditioned against reading and also against severe adults. The inhibiting fear she felt really came from the buried, almost forgotten, unpleasant tutoring experiences, not from books. Thus we see how one's reaction to present activities may really represent feeling tones associated with past, buried, forgotten experiences. After expressing her feelings and talking them over, the youngster realized why she was upset by attempts to read. The girl had needed to talk out

her feelings and understand them. Calm supportive and unemotional management could help her. This was especially so while reading.

Discovery of reading disabilities.—Many cases of unrecognized reading disability have been uncovered and steps taken to secure the necessary skilled remedial teaching. A 15-year-old boy took no interest in his studies, fought with younger boys, and was insolent to his teacher. He often walked out of school when corrected and stayed out all day. He was found to be of average intelligence, was usually polite outside of the school situation, and had no real delinquent tendencies. His poor attitude toward school was due at least in part to a reading disability. He was 3 years retarded in his reading. Because of this special disability, he had spent several years in a special class and had been considered mentally slow and likely to be led into trouble by other boys. If his reading disability had been recognized earlier and not mistaken for limited intelligence, his present attitude might not have developed and he might never have become a serious problem.

Delinquency control and prevention.—The prevention and control of delinquency is an important part of a well-rounded community program. All preventive and treatment efforts have a bearing on this topic. The more integrated, well-adjusted, and appropriately supervised the child, the less likely is he or she to become delinquent. The Probation Department works closely with our staff. Of the first 200 cases studied, 49, or one-quarter, have been referred by the Juvenile Court, the Probation Department, or a similar agency. In addition, another 34 cases have shown some overt delinquent trends. This makes a total of over 41 percent of our cases where a delinquent tendency has been observed. Slightly more than one-half of this number have been children under 16; one-fourth have been adolescents; and only one-fourth were adults (21 years of age or older).

Case example.—Some of the cases regarded adversely by the community were found not to be confirmed delinquents. One group of 3 boys, A, aged 15, B, aged 14, and C, aged 13, had been engaged in minor delinquencies. The police found out about them when C became so troubled that he not only told what he had done, but also the names of the other boys who had been with him during the various offenses. Destructive acts, such as breaking light bulbs with an air gun, taking food from houses, and minor thefts from stores and cars had occurred. When studied, none of the three boys showed signs of confirmed or dangerously antisocial delinquency. The authorities tended to blame the eldest, A, and felt he was the leader. However, he was found to be docile, easily led, and feeble-minded. The home background was so inadequate that he was finally placed under the protection of a school for the feeble-minded. The one who furnished

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the most leadership, C, was emotionally and physically sick. After customarily being kept at home and protected, C suddenly found himself unsupervised on evenings when his mother went to work. Residence in a special school was advised for special treatment and educational training. B, who was childish, naive, and had been infantilized at home, joined C for only one night. He was given guiding supervision while remaining at home.

Community prevention program.—Some residents, the police, and the school had felt that they were dealing with a gang of bad boys. If routine procedures had been followed several might needlessly have been sent to correctional schools, the regime of which would not ordinarily be suited to their special needs. Some follow-up reporting work with the parents, teachers, and police was helpful in forwarding the development of a community preventive program.

Court action frequently not necessary.—Many delinquency problems have been solved by social case work methods and so did not require the authoritative action of the Children's Court. Every effort has been made to adjust children in their own homes in the community. When confinement has been unavoidable, a careful selection with the judge has been made of the institution or school which was most adapted to meet the child's particular needs. Many private or special schools have been utilized in addition to the State institutions. Of the 29 frankly feeble-minded cases uncovered, only 17 required institutionalization for training or protection. All child guidance activities may be properly grouped under the heading of prevention or control of delinquency.

The problem of mental illness.—The usual objective of all mental hygiene services to reduce the number of admissions to mental hospitals has been considered. Authorities[1] differ on the amount of preventive work that can be accomplished successfully. In the present state of our knowledge certain types of functional mental illness undoubtedly are not readily amenable to prevention. However, investigations in this field are worthwhile. Methods similar to the epidemological approach to the control of infectious diseases would seem applicable to the problems of mental disease. Certainly the modern public health methods being used to limit the psychotic complications of syphilis should be productive in reducing the proportion of mental hospital admissions from this cause. The prevention of emotional problems in childhood could be expected to lessen the number of poorly-knit, inadequate personalities, who are so vulnerable to mental breakdowns. Last year there were 156 first admissions of Suffolk County residents to State hospitals. The rate was 427.7 per 100,000 of the population. About 840 cases of local residents were under such hospital treatment.

Special advantages of being a unit of the health department.—Child guidance and mental hygiene clinics have operated under various auspices. In Suffolk County there are multiple advantages in being an integral part of the health department. We have mentioned the Department's close cooperating working relationship with the medical profession. However, the most important asset involves the public health nurses, who occupy a unique position in the rural areas. They customarily deliver the birth certificate to the parents. This early contact enables them not only to be instrumental in furthering proper infant feeding and preventive medical care, but to know intimately the families of preschool children. The position of school nurse has customarily carried with it the functions of a visiting teacher and many social work duties. The mental hygiene unit of a health department therefore, in the nursing staff, has direct access to the local communities and an idealy situated cooperative resident worker.

SUMMARY

The adaptation of child guidance and mental hygiene techniques to the situation in this county has been productive and it is felt that surprising progress has been made. The selection of a centrally located main office, the conservation of time for follow-up treatment, and emphasis on the more profitable work with juveniles are universally accepted objectives. Based on the experience of the last year, the following tentative suggestions are made concerning services to rural areas:

(1) After a preliminary survey, the educational, clinical, and all other phases of the program should be kept flexible by continuing to determine local needs and formulating ways of meeting them.

(2) Medical treatment facilities may be obtained by working cooperatively and closely with the private physicians in the county.

(3) Some of the disadvantages of a traveling clinic service can be minimized in two ways;

(a) By the major use of a main working center and the judicious use of traveling clinics.

(b) By operating through local, cooperative, trained workers, resident in each locality served. This may be readily accomplished by organizing the clinical unit as a division of a health department, which has public health nurses living in various areas.

(4) The service potentialities of the staff can be widened by also utilizing each member as an expert consultant in a special field, the specialized aspects of social work, the application of clinical psychology in the public schools, and the usual psychiatric consultations to the medical profession. Inasmuch as the staff usually work as a team and consult frequently, no one need attempt the solution of problems beyond his or her skill or training.

(5) An effective educational procedure, to widen the use of preventive mental hygiene principles, can be carried out by the utilization of clinical case material in the teaching case conferences attended by the interested representatives of cooperating professional groups.

CONCLUSION

Mental hygiene and child guidance services, which are widely used in urban centers, should be extended to rural areas. There is a great demand for such work. In Suffolk County a mental hygiene unit has been organized in the county health department and serves the Juvenile Court, county welfare and social agencies, schools, and various scattered communities. This county has exceptionally good schools, progressive social agencies, and a growing health program. There are an active Council of Social Agencies, a Social Service Exchange, well-organized medical resources, and a well-informed public opinion. This is therefore a favorable rural area for the development of a sound practical mental hygiene program. There are multiple advantages in operating as a division of the health department, the staff of which, especially the public health nurses, have such a close tie-up with the various local schools and communities. County departments of health may well consider the advisability of including a mental hygiene unit in their organization to aid in the promotion of the wider aspects of public health. The emergencies of the war situation have only enhanced the need for such services, by participation in the organization and personnel training necessary for some specialized groups in the local civil mobilization plan. We are looking forward to making a more detailed report after an extended period of operation.

TRANSMISSION OF RUBELLA TO *MACACUS MULATTA* MONKEYS [1]

By KARL HABEL, *Passed Assistant Surgeon, United States Public Health Service*

The clinical picture of rubella or German measles in man is usually that of a mild, self-limited disease consisting of moderate fever, malaise, slight respiratory symptoms, enlargement of the lymph nodes (posterior cervical), leukopenia with a relative lymphocytosis, and a light generalized macular rash. Complications have been considered uncommon and not serious in nature.

Probably because of this mildness of the disease in man comparatively little experimental work has been concerned with rubella. Its resemblance clinically to rubeola has resulted in the assumption that the causative agent is a virus, but not until the experiments of Hiro and Tasaka (*1*) was this hypothesis proven. Nasal washings from 4 cases of rubella in the acute stage of the disease, just after the appearance of the rash, were filtered by these workers and injected

[1] From the Division of Infectious Diseases, National Institute of Health.

subcutaneously into 16 children between the ages of 7 months and 9 years. Six of the 16 developed a typical rubella, while 2 had all the usual symptoms but no rash. The incubation period varied from 5 to 17 days, being 7 to 11 days in 6 of the cases. At about the same time Steinmaurer (*2*) reported finding virus particles in nasal and throat washings, blood, and blister fluid from the skin of rubella patients by use of the fluorescent microscope.

There are but two available reports of attempts to transmit rubella to experimental animals. Hess (*3*) inoculated four monkeys intraperitoneally with blood taken within 24 hours of the appearance of the rash in human cases. Only one monkey developed a temperature elevation on the nineteenth day, but no rash was observed and no blood counts were taken. Slatineano et al. (*4*) tried to transmit the disease to man, rabbits, and guinea pigs with throat washings and defibrinated blood, with negative results.

Recent reports (*5*, *6*, *7*) have indicated an increase in the number of human cases showing complications, especially arthritis and neuritis, and have shown that encephalitis may occur following rubella. This, together with the relatively high incidence in adults, especially in camps with their concentration of military personnel, has made it seem worthwhile to apply to rubella some of the experimental work that has been performed with rubeola.

Opportunity for this study was afforded in the spring of 1941 by the occurrence of many cases of rubella in and near Washington, D. C., at a time when experimental work in rubeola was being attempted.

METHOD

Specimens from patients were obtained, usually within 12 hours after the appearance of the typical macular rash. Nasal washings were made with salt solution and blood was either defibrinated or oxalated.

Macacus mulatta (rhesus) monkeys weighing from 3 to 7 pounds received from 2 cc. to 5 cc. of blood subcutaneously, intraperitoneally, intranasally, or intravenously. Intranasal instillation of filtered or unfiltered washings was done under light ether anesthesia. All inoculations were performed on the same day the materials had been collected.

Temperatures were taken on all monkeys twice daily. Blood counts consisting of total white blood cells and differential white blood cell counts were done daily, the blood being obtained from a superficial vein of the leg early in the day, before the animals had been fed. Each monkey was also examined twice daily for signs of respiratory symptoms, lymph node enlargement, exanthem, and enanthem. These procedures were carried out for 21 days following inoculation.

Transfers were made by blood obtained by cardiac puncture of the etherized animal. A total of 41 monkeys was used in this study of materials from 9 patients.

CLINICAL PICTURE IN MONKEYS

Twelve monkeys developed a rash, 9 following inoculation with human material, 2 on monkey passage, and 1 after receiving chick embryo passage material. The following description of the symptoms and blood picture in monkeys is based on the findings in this group of 12 animals.

In general, the signs of infection were very mild. After an incubation of 8 or 9 days a leukopenia developed, followed in 1 or 2 days by a relative lymphocytosis, a slight fever, and rash.

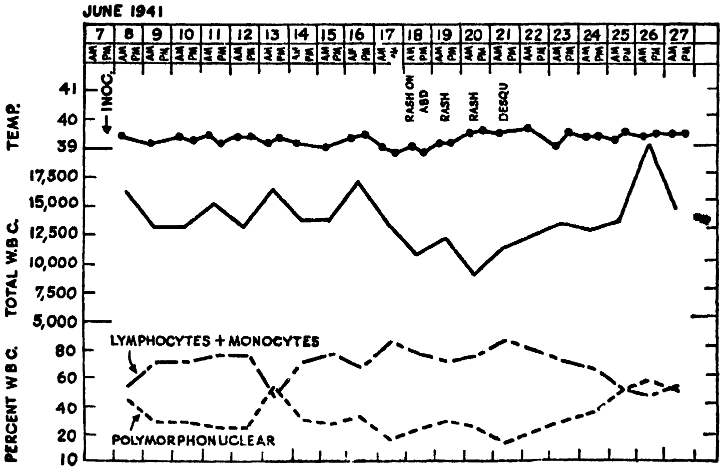

FIGURE 1.—Rubella in monkey with rash. Original isolation from human rubella blood. Monkey 778. Inoculated intravenously with 5 cc. defibrinated blood from case 18.

No evidence was observed of respiratory symptoms, lymph node enlargement, gastrointestinal, or nervous symptoms.

Fever: Six to 16 days following inoculation, 7 of the 12 monkeys had an elevation of temperature of at least 0.5° C. The highest elevation was 1° and the average 0.5°, while the average onset of the fever was 10.4 days. The duration of the fever extended from 2 to 9 days and the average was 5.1 days. An elevation of temperature was determined by a rise above the base line established in the first 5 days of the experiment for each monkey.

Leukopenia: It is well known that the white blood cell counts of monkeys vary and that it is impossible to state arbitrarily the normal count without having performed them for several days in the individual monkey. Daily blood counts were done on 6 monkeys for 7 days before inoculation intravenously with normal human and monkey

blood and continued for 21 days after inoculation. No changes were noted in the white cell counts as the result of the inoculation; therefore, in all monkeys used in these experiments the normal count for the individual was taken as the average during the first 5 days following the inoculation. The presence or absence of a leukopenia was determined by a drop in the total count of at least 2,000 cells per cu. mm. averaged over a period of at least 3 consecutive days.

All 12 monkeys exhibiting a rash had a leukopenia representing a drop in total white blood cell counts of from 2,000 to 6,500 cells per cu. mm. and the average drop was 3,500. The leukopenia developed from the fourth to the fourteenth day and averaged 8.7 days after

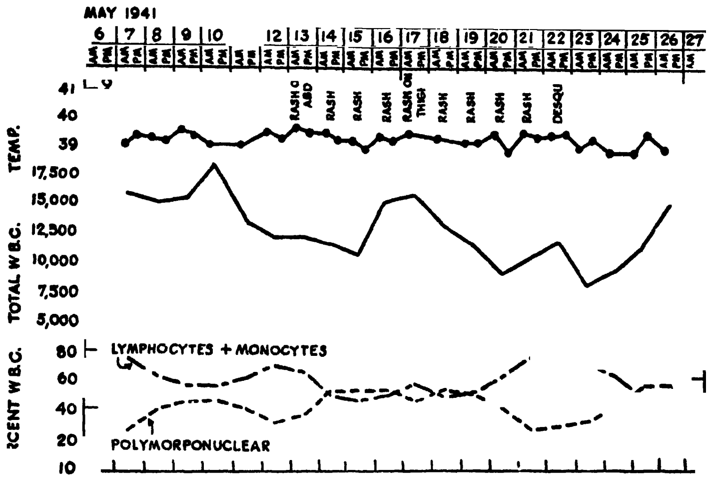

FIGURE 2.—Rubella in monkey with rash. Original isolation from human rubella nasal washings Monkey 784. Inoculated intranasally with nasal washings from case 17.

inoculation. The time the leukopenia became apparent was within 3 days of the onset of the fever in all cases, 3 being before, 3 after, and 1 on the same day as the fever. The leukopenia lasted from 3 to 14 days and averaged 7.2 days.

Lymphocytosis: Eight of the monkeys had an increase in the number of lymphocytes plus monocytes, as compared to polymorphonuclear leucocytes on differential cell counts. In 6 cases the lymphocytosis occurred within 3 days of the onset of the leukopenia. Its onset varied from 6 to 14 days from inoculation and the average was 10.7 days. This lymphocytosis persisted for 2 to 7 days, the average duration being 4.7 days.

Exanthem: The rash consisted of a rather sparsely scattered, light pink, macular eruption similar to that occurring in man, but less distinct, being minimal in 4 and more marked in 8 animals. The most consistent location was on the lower abdomen, where it was found in

all 12 cases. Three monkeys also had a rash on the face and thighs, and 3 more on the thighs as well as on the abdomen. The onset of the rash varied from the seventh to the seventeenth day following inoculation and averaged 11.3 days. It lasted from 1 to 8 days, averaging 3.4, and was followed by a slight scaly desquamation in 7 cases, in one of which definite pigmentation was also noted. The rash appeared before the onset of either the fever or leukopenia in 1 case, at the same time in 2 cases, and later in 9 cases; it became apparent within 4 days of the time of onset of these symptoms in 9 instances. No lesions were noted on the oral mucus membranes either before or during the rash. This rash in monkeys with rubella was very sim-

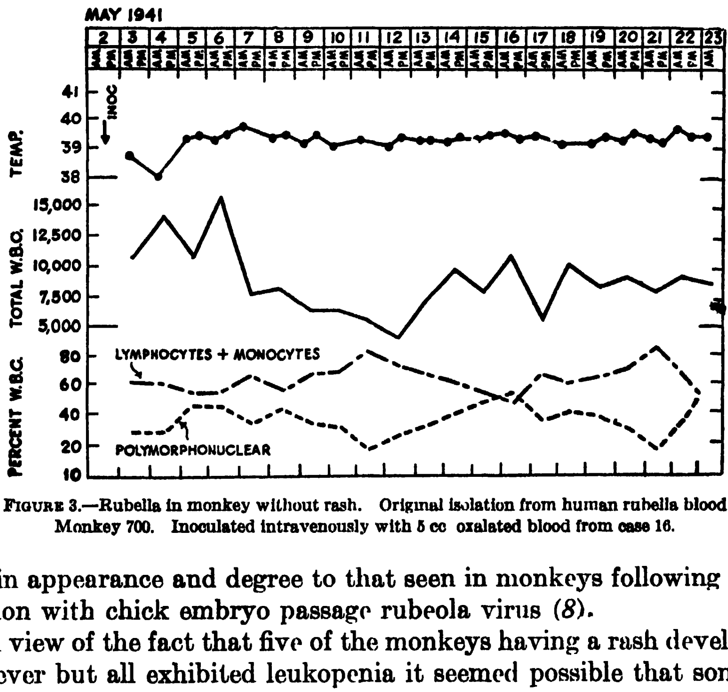

FIGURE 3.—Rubella in monkey without rash. Original isolation from human rubella blood. Monkey 700. Inoculated intravenously with 5 cc oxalated blood from case 16.

ilar in appearance and degree to that seen in monkeys following inoculation with chick embryo passage rubeola virus (*8*).

In view of the fact that five of the monkeys having a rash developed no fever but all exhibited leukopenia it seemed possible that some of those monkeys in which no rash was detected might have suffered an infection with rubella, as indicated by the blood count change. Evidence that rubella infection without a rash is possible in man is found in the report of Hiro and Tasaka (*1*) in which six children inoculated experimentally with filtered nasal washings from cases of rubella developed a typical rash, while two others showed a lymphadenopathy and leukopenia, but no rash or fever. Flöystrup (*9*) also notes the development of mild catarrhal symptoms and lymphadenopathy but no rash in his own son after exposure to rubella, while a typical rubella with rash subsequently occurred in another son after exposure to the first child.

Because of this possibility and to further check on the blood count response of normal monkeys, a group of 6 monkeys was observed for 7 days, twice daily temperatures and daily blood counts being taken. Three then received 5 cc. of defibrinated normal human blood intravenously and three received defibrinated normal monkey blood. Temperature and blood count determinations were continued for another 21 days. Only two monkeys developed a drop in the total white blood cells of 2,000 or more per cu. mm., which occurred in both instances on the third day following inoculation and was not accompanied by fever. One had received human and one monkey blood.

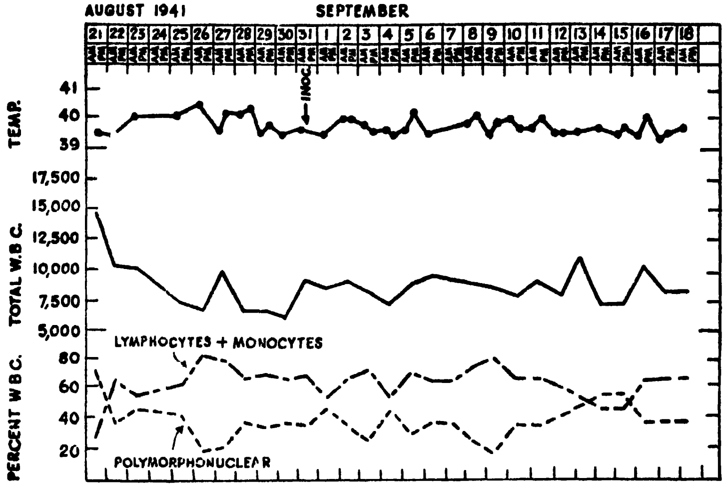

FIGURE 4.—Normal monkey response to intravenous inoculation of normal human blood. Monkey 807. Inoculated with 5 cc. defibrinated normal human blood intravenously.

Therefore, the diagnosis of *possible* rubella infection in inoculated monkeys was limited to those exhibiting a leukopenia of at least a 2,000 decrease in total count accompanied by an increase in the percentage of lymphocytes and monocytes, either with or without fever, provided that these blood count changes occurred between the fifth and fourteenth days.

On this basis, besides the 12 monkeys with a rash a further 15 monkeys were positive on inoculation. Of these, 8 were primary inoculations (6 with human blood and 2 with nasal washings), 6 were on subsequent passage, and 1 in a monkey inoculated with chick embryo passage material.

For accuracy throughout the remainder of this paper results of monkey inoculation will be expressed as negative or positive, with or without a rash.

PRIMARY ISOLATION OF VIRUS FROM HUMAN CASES OF RUBELLA

From blood:

a. By intravenous inoculation, 4 of 6 monkeys developed rubella with a rash, 1 without a rash, and 1 was negative.
b. By subcutaneous inoculation, of 2 monkeys both showed rubella with a rash.
c. By intraperitoneal inoculation, 1 monkey was tested and was positive without any rash.
d. Blood introduced intranasally in 1 monkey produced rubella without a rash.

From nasal washings:

Of 6 monkeys receiving nasal washings intranasally, 1 was negative, 3 positive with a rash, and 2 positive without a rash.

There were 6 human cases in which both blood and nasal washings were tested in monkeys. Five showed a positive result with both, and one a negative result with both. In 3 of these 5 positives the monkeys had a rash with both types of inocula.

The results in individual monkeys following these primary isolations are shown in table 1.

ROUTES OF ADMINISTRATION

Intravenous: Twelve monkeys received blood by the intravenous route, 6 being original isolations and 6 monkey blood passages. As noted previously, 5 of 6 of the former group were positive, while 4 of the latter group were positive, none with a rash. The average incubation period by this method of inoculation was 7.6 days.

Subcutaneous: Two original isolations, both positive, and one passage also positive but without a rash, were obtained by this method of inoculation. The average incubation time was 8.3 days.

Intraperitoneal: Only one original isolation was attempted by this method and that had an incubation period of 14 days.

Intranasal: As noted above, 7 monkeys were inoculated in this manner with original human material and 6 were positive. The average incubation period was 6.5 days.

MONKEY PASSAGE

One attempt was made to passage monkey nasal washings by the intranasal route but was unsuccessful.

Three human strains were transferred in monkeys by means of blood given intravenously and 2 were positive, 1 after one passage and 1 after five passages.

TABLE 1.—*Primary isolation of rubella virus in monkeys.*

Case No.	Number hours after rash material obtained	Symptoms present	Type of material	Route of inoculation	Monkey No.	Fever: Degree C.	Fever: Onset	Fever: Duration	Leukopenia: Degree	Leukopenia: Onset	Leukopenia: Duration	Lymphocytosis: Degree per cent	Lymphocytosis: Onset day	Rash: Onset day	Rash: Duration	Rash: Location	Rash: Desquamation
4	12	Fever, respiratory symptoms.	Blood	SC	753	0.5	16	2	6500	14	9	10	14th	12	4	Face, abdomen, thighs.	+
12	48	Fever, lymphadenopathy.	Blood	IV	744				-			10	5th				
			Nasal washings	IN	490												
13	24	Fever, lymphadenopathy.	Blood	IV	749				5000	7	4	10	10th	10	2	Face, abdomen, thighs.	−
			Nasal washings	IN	747				2500	4	6	20	11th	8	4	Abdomen	+
14	6	Fever, leukopenia, lymphadenopathy, respiratory symptoms	Blood	IV	649	.5	11	7	2000	14	3	10	13th	17	1	Abdomen, thighs	−
			Nasal washings	IN	703	.5	10	3	3000	12	5	10	9th	14	1	Abdomen	−
15	6	Lymphadenopathy	Blood	SC	768	.8	6	9	2500	8	9	15	6th	11	3	Abdomen	−
			Nasal washings	IN	766	1.0	5	9	2500	13	4						
16	No rash 2d day of fever.	Fever, lymphadenopathy.	Blood	IV	780				6500	5	6	10	7th				
			Nasal washings	IN	606	.5	5	5	5000	8	8	10	12th				
17	6	Fever, respiratory symptoms, lymph adenopathy.	Blood	IV	764				5000	11	10	5	9th	7	7	Abdomen	+
			Nasal washings	IN	784				4000	5	14	20	14th	7	8	do	+
18	6	Fever, malaise	Blood	IV	778	.5	13	3	3000	11	8	5	10th	11	4	do	+
			do	IN	777	.5	10	4	2000	11	7	10	10th				
20	24	Lymphadenopathy	do	IP	852				3000	4	4	10	4th				

Table 2 shows these passage strains and the results.

TABLE 2 (a).—*Monkey passage of rubella*

Case 4	Case 17		Case 14	Case 18
Monkey 753	Monkey 764	Monkey 781	Monkey 703	Monkey 777
Monkey 746	Monkey 774		Monkey 767	Monkey 796
	Monkey 687			
	Monkey 776	Monkey 779		
	Monkey 795	Monkey 797		

TABLE 2(b).—*Monkey passage of rubella*

Passages	Material transferred	Time material obtained	Route of inoculation	Incubation period (days)	Fever	Leukopenia	Lymphocytosis	Rash
Case 4								
Monkey 753	Blood Nasal washings	12 hours rash 5 days rash	SC IN	12	+	+	+	+
Monkey 746					−	−	−	−
Case 17								
Monkey 761	Blood	6 hours rash	IV	7	−	+	+	+
Monkey 781	Blood	2 days rash, 2 days fever	IV	7	+	+	+	−
Monkey 774				8	−	+	+	−
Monkey 687	Blood Blood	Lowest leukocyte count (11th day). Highest temperature, lowest leukocyte count (11th day).	IV IV	8	+	+	+	−
Monkey 776				13(?)	+	−	−	−
Monkey 779				11	+	+	−	−
Monkey 795	Blood Blood	3 days fever 4 days fever	IV IV	6	+	+	+	−
Monkey 797				7	+	+	+	−
Case 14								
Monkey 703	Nasal washings Blood	6 hours rash 1 day before rash	IN IV	10	+	+	+	+
Monkey 767				7	−	+	+	−
Case 18								
Monkey 777	Blood Blood	6 hours rash 3 days fever	IN IV	10	−	+	+	−
Monkey 796					+	−	−	−

TEST OF IMMUNITY

Five monkeys that had developed rubella with a rash and two without a rash were retested after an interval of 4 to 11 weeks by reinoculation with either human rubella blood or monkey passage rubella blood. The test material for this second exposure was shown to contain virus by simultaneous inoculation of fresh monkeys which were positive.

Table 3 shows the results of both the original and second exposures and it is seen that only two were proven immune.

TABLE 3.—*Test of rubella immunity in monkeys*

Monkey	Source of virus	Date (1941)	Route of inoculation	Incubation period (days)	Fever	Leukopenia	Lymphocytosis	Rash
Monkey 649.								
1st inoculation	Case 14 blood	Apr 19	IV	17	+	+	+	+
2d inoculation	Case 17 blood	May 6	IV	10	+	+	+	−
Monkey 703:								
1st inoculation	Case 14 washings	Apr. 16	IN	14	+	+	+	+
2d inoculation	Case 17 blood	May 6	IV	13	−	+	+	−
Monkey 747:								
1st inoculation	Case 13 washings	Mar. 22	IN	8	−	+	+	+
2d inoculation	Monkey 774 blood	May 27	IV	---	−	−	−	−
Monkey 749.								
1st inoculation	Case 13 blood	Mar. 24	IV	10	−	+	+	+
2d inoculation	Monkey 774 blood	May 27	IV	9	+	+	−	−
Monkey 766:								
1st inoculation	Case 15 washings	Apr. 15	IN	5	+	+	−	−
2d inoculation	Monkey 774 blood	May 27	IV	------	−	−	−	−
Monkey 767								
1st inoculation	Monkey 703 blood	Apr. 25	IV	7	−	+	+	−
2d inoculation	Monkey 774 blood	May 27	IV	14	+	+	+	+
Monkey 768								
1st inoculation	Case 15 blood	Apr 20	SC	11	+	+	+	+
2d inoculation	Monkey 774 blood	May 27	IV	11	+	+	+	+

CROSS-IMMUNITY WITH RUBEOLA

Attempt to demonstrate lack of cross-immunity with rubeola was done in two ways, namely, injection of convalescent rubeola monkeys with rubella material and inoculation of rubeola virus into a previously rubella-positive monkey.

Monkeys 764, 766, and 768 had all developed a typical rubeola with a heavy rash following inoculation with either human or monkey passage virus. Monkey 764 received blood intravenously from case 17, monkey 766 nasal washings intranasally from case 15, and monkey 768 blood subcutaneously from case 15. Monkeys 764 and 768 both developed rubella with a rash, and 766 without a rash.

Monkey 606 had been inoculated with rubeola blood proven to contain active virus, but was insensitive. On subsequent exposure to rubella virus (nasal washings case 16) there was a rubella without a rash.

Monkey 755 developed a rubella with a rash after inoculation with chick embryo passage virus and was later exposed to rubeola by injection of monkey-passage blood. The result was a typical rubeola with a heavy rash.

RUBELLA IN MAN WITHOUT RASH

Case 16 was a 4-year-old boy in a physician's family. He was definitely exposed to rubella on April 9, 10, and 11, 1941. On April

28 he developed fever, malaise, and slight rhinitis, followed by posterior cervical lymphadenopathy. On May 2 he was bled and nasal washings were obtained in the belief that he was in the pre-eruptive stage of rubella. However, even with constant search, no sign of rash was subsequently noted.

Monkey 700 received 5 cc. of the oxalated blood intravenously and developed a marked leukopenia (drop of 6,500) on the fifth day, followed by an elevation of lymphocytes, but no fever or rash.

Monkey 606 was given the nasal washings intranasally and reacted with a fever, leukopenia and lymphocytosis on the eighth day.

G. H., the 22-month-old sister of case 16 was definitely exposed to case 16 at the time of his illness. One month later, on June 2, 1941, G. H. developed malaise, fever, posterior cervical lymphadenopathy, and a blood count at that time showed a leukopenia of 3,900 leucocytes per cu. mm. with 90 percent lymphocytes. No rash was noted and no specimens were obtained for monkey inoculation.

It is also interesting to note that another physician's 8-year-old son, who was definitely exposed to a case of rubella, developed a fever, malaise, posterior cervical adenopathy, but no rash, 18 days after the exposure.

CULTURE OF RUBELLA VIRUS ON CHORIO-ALLANTOIC MEMBRANE OF DEVELOPING CHICK EMBRYO

Eggs incubated 11 to 13 days were opened by the Burnet technique and 0.15 cc. of human rubella blood inoculated directly on the chorio-allantoic membrane. After 4 or 5 days' further incubation at 36° C., the membranes were removed and ground in a mortar with sterile sand and 3 cc. of broth added for each membrane. Next passage embryo membranes were inoculated with 0.15 cc. of the supernatant of this emulsion. Four strains were carried for 5 egg passages, then 5 cc. of the supernatant inoculated into monkeys.

Monkey 755 was inoculated subcutaneously with fifth egg passage material from case 4. The original human blood used to inoculate the chick membranes had been shown positive in monkey 753. Monkey 755 showed a leukopenia on the fifth day, continuing for 10 days, and developed a rash on the fourteenth day.

Blood from case 13 had been positive on inoculation of monkey 749 and after 5 egg passages was injected subcutaneously into monkey 780, with negative results.

Monkey 778 had reacted positively with a rash to inoculation with case 18 blood. The fifth egg passage of this blood, when given to monkey 856, intravenously, resulted in a fever, leukopenia, and lymphocytosis on the fourteenth day, but no detectable rash.

Blood from case 20, when inoculated intraperitoneally in monkey 852, had been positive without a rash. Monkey 858, after receiving the fifth egg passage material, intravenously, was negative.

No specific pathological lesions were found either grossly or histologically in the inoculated membranes or the embryo organs.

DISCUSSION

The important question concerning the experiments here reported is whether the symptom complex produced in the monkeys was really rubella.

The first point to consider is the accuracy of the diagnosis in the human cases supplying material for monkey inoculation. There was no question as to the clinical diagnosis in all cases except case 16, this being the only instance in which a typical rash did not appear. All cases had been exposed to rubella at the proper interval before the appearance of symptoms, and all had a definite history of previous rubeola. All but two individuals were past the age of 15 years.

Final proof of the specificity of the monkey reaction is lacking insofar as monkey-passage material was not inoculated back into susceptible human beings.

Further evidence of the specificity of the disease in monkeys would be the demonstration of immunity to reinfection after the monkey had once reacted. The results of these immunity tests at first seemed quite irregular. Two monkeys having rubella with a rash were retested 5 weeks later and were again positive, but without any rash. One monkey with a rash on the initial exposure again had infection with a rash 6 weeks later. Two monkeys were retested 7 weeks after the first response. One that had had no rash originally was negative and the other had a rash on both exposures. Two monkeys that had developed a rash when first exposed were retested 11 weeks later; one was negative, the other had rubella but no rash. Therefore, of seven attempts to demonstrate immunity only two were successful, one when retest was at an interval of 7 weeks and one at 11 weeks. Three having a rash on first exposure were positive without a rash on retest, and two developed a rash after both inoculations.

However, these results do not seem so contradictory in view of reports in the literature concerning so-called relapses of rubella in human cases. Humphrey and Eckermyer (*10*) report an epidemic in a children's home involving 316 cases in which there were 19 relapses occurring from 12 to 43 days after the first attack. Geiger (*11*) reports 15 relapses in 173 cases in an area adjacent to an army cantonment, the relapses occurring 3 to 5 weeks after the first attack. In 5 cases he reports three attacks and notes that in one of these the third attack came at the proper incubation period after another ex-

posure. Although Humphrey and Eckermyer call their cases relapses, actually they were being constantly reexposed in an institution following discharge from isolation with their first attack.

We feel that there is no doubt that those monkeys exhibiting a rash with concomitant leukopenia and fever after a proper incubation period were suffering from rubella. Demonstration of immunity to reinoculation after a sufficient lapse of time is further evidence of the specificity of this monkey reaction. On the other hand, it seems that there is more basis for question of the diagnosis of rubella in those monkeys developing fever, leukopenia, and lymphocytosis after the proper incubation period, but without any demonstrable rash. Fifteen of the total of 27 monkeys diagnosed as positive in these experiments were reactions of this type. Evidence of this being an actual infection is:

1. All 12 monkeys exhibiting rash had a leukopenia and lymphocytosis between the fourth and fourteenth days.
2. With several specimens of human rubella blood inoculated simultaneously into several monkeys, some developed the complete picture, including a rash, and others only the blood cell changes after a similar incubation period.
3. Normal monkeys inoculated with normal human and monkey blood did not show the same picture.
4. Monkeys inoculated intranasally with rubella nasal washings, as well as those receiving blood intravenously, or subcutaneously, reacted with this same type of "inapparent" infection.
5. Subsequent monkey passage from these monkeys having rubella without a rash also resulted in the production of the same type of reaction.
6. Evidence is presented in the literature showing that in man we may have an "inapparent" infection after either artificial or natural exposures.

Realizing the limitations discussed above as to the specificity of the disease produced in our monkeys, we may summarize our experiments as follows:

Macacus mulatta monkeys are susceptible to rubella and when inoculated with virus-containing material respond with a mild infection characterized by the development of a leukopenia after an incubation averaging 8 days, a fever and lymphocytosis about the tenth day, followed by a very light scattered macular rash on the face, chest, abdomen, and thighs starting about the eleventh day and followed by desquamation.

The monkeys appear equally susceptible to virus introduced intranasally, subcutaneously, intraperitoneally, and intravenously.

The development of rubella with rash seems to occur in a larger proportion of the monkeys receiving the original human material than on subsequent monkey-to-monkey passage.

Viable virus was demonstrated in the blood of all 5 patients bled within 12 hours after the onset of their rash. Two patients bled between 24 and 30 hours after they had first noticed their rash were

positive. One patient was bled on the third day of rash and the monkey remained negative.

Nasal washings obtained within 12 hours of the appearance of the rash were positive from all of three patients. One case supplied nasal washings at the end of 24 hours' rash and was positive. The monkey receiving washings taken on the third day of rash was negative.

Virus also seemed to be present in the blood of infected monkeys at the time of the appearance of the rash and early in the period of leukopenia and fever in those monkeys not exhibiting a rash.

Further evidence that rubella can occur in man without the presence of a rash is presented with the production of infection in monkeys from blood and nasal washings obtained during the fever and lymphadenopathy of such a human case. Two further human cases of "inapparent" infection are added to that reported by Flöystrup.

It is suggested that immunity following rubella may be slow in developing. It was planned to retest our positive monkeys after a longer interval but human material was no longer available and stored frozen virus has proven inactive.

Culture of the infective agent of rubella on the chorio-allantoic membrane of the developing chick embryo was successful in two of four attempts.

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INCIDENCE OF HOSPITALIZATION, JUNE 1942

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 8,000,000 members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service. The data cover about 60 hospital service plans scattered throughout the country, mostly in large cities.

Item	June 1942	June 1941
1. Number of plans supplying data	65	37
2. Number of persons eligible for hospital care	8,659,649	4,990,308
3. Number of persons admitted for hospital care	86,363	48,516
4. Incidence per 1,000 persons, annual rate, during current month (daily rate x 365)	121 2	118.0
5. Simple average of annual rates for the twelve months ended June 30	107 2	

DEATHS DURING WEEK ENDED JULY 18, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 18, 1942	Corresponding week 1941
Data from 86 large cities of the United States		
Total deaths	7,787	7,139
Average for 3 prior years	7,212	
Total deaths, first 28 weeks of year	238,071	241,497
Deaths per 1,000 population, first 28 weeks of year, annual rate	12 0	12 2
Deaths under 1 year of age	541	487
Average for 3 prior years	466	
Deaths under 1 year of age, first 28 weeks of year	15,420	14,328
Data from industrial insurance companies		
Policies in force	64,948,767	64,382,355
Number of death claims	10,229	11,973
Death claims per 1,000 policies in force, annual rate	8.1	9 7
Death claims per 1,000 policies, first 28 weeks of year, annual rate	9 6	10.0

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JULY 25, 1942

Summary

There was a sharp increase in the incidence of poliomyelitis during the week—a total of 124 cases was reported, as compared with 83 for the preceding week, 303 for the corresponding week last year, and a 5-year (1937–41) median of 139. The South Atlantic, South Central and East North Central States reported 98 cases, or approximately 80 percent of the current total. The States in these areas reporting the largest numbers of cases are as follows (last week's figures in parentheses): Kentucky 20 (17), Arkansas 15 (11), Illinois 12 (6), Tennessee 11 (5), and Michigan 7 (4). No other State reported more than 5 cases for the week.

The number of cases of meningococcus meningitis declined from 63 last week to 45 for the current week. The largest numbers of cases occurred in New York (9) and Virginia (7). Only one other State (Maryland, 4) reported more than 3 cases.

A total of 138 cases of endemic typhus fever was reported, as compared with 58 for the preceding week. Of the current total, 69 cases occurred in Texas and 27 in Georgia. Increasing numbers of cases of typhus are being reported weekly from the lower Gulf Coast area of Texas.

Only 3 cases of smallpox were reported, all in the North Central States. Of 298 cases of typhoid fever, 197, or 66 percent, occurred in the South Atlantic and South Central States.

Other diseases reported during the current week include 1 case of anthrax in New Jersey, 341 cases of bacillary dysentery (241 in Texas), 31 cases of amebic dysentery, 238 cases of unspecified dysentery (209 in Virginia), 12 cases of infectious encephalitis (all in the Middle Atlantic and North Central States), 33 cases of Rocky Mountain spotted fever (of which only 2 occurred in the Mountain and Pacific States), and 21 cases of tularemia.

The death rate for the current week in 88 large cities in the United States is 11.8 (annual basis) per 1,000 population, as compared with 11.0 for the preceding week and with a 3-year (1939–41) average of 11.0 for the corresponding week. The current rise in the death rate corresponds to a similar rise about the same time last year and is probably attributable, in part at least, to prevailing excessive temperatures.

Telegraphic morbidity reports from State health officers for the week ended July 25, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	July 25, 1942	July 26, 1941		July 25, 1942	July 26, 1941		July 25, 1942	July 26, 1941		July 25, 1942	July 26, 1941	
NEW ENG.												
Maine	0	0	1	-----	-----	-----	26	29	25	2	0	0
New Hampshire	0	0	0	-----	-----	-----	0	3	3	0	0	0
Vermont	0	0	0	-----	-----	-----	57	32	23	1	0	0
Massachusetts	2	2	2	-----	-----	-----	185	178	178	2	2	1
Rhode Island	0	3	0	-----	-----	-----	38	10	19	0	0	0
Connecticut	0	0	1	1	-----	1	83	72	17	0	0	0
MID. ATL.												
New York	4	7	10	[1] 4	[1] 4	[1] 4	184	355	491	9	5	5
New Jersey	2	0	3	2	2	2	122	183	183	0	0	0
Pennsylvania	9	2	10	-----	-----	-----	98	364	275	3	1	2
E. NO. CEN.												
Ohio	2	5	6	8	1	2	73	195	58	0	1	0
Indiana	4	2	2	-----	8	8	14	27	16	1	0	1
Illinois	9	17	18	4	-----	6	44	77	77	1	0	1
Michigan [2]	2	1	5	1	-----	-----	105	133	133	0	0	1
Wisconsin	3	0	2	12	6	6	280	280	280	0	3	0
W. NO. CEN.												
Minnesota	1	0	0	2	2	1	40	10	13	0	2	0
Iowa	0	1	1	-----	1	-----	57	34	34	1	0	0
Missouri	2	2	5	1	2	1	8	32	8	0	0	0
North Dakota	4	3	3	2	-----	-----	10	14	3	0	0	0
South Dakota	1	1	0	-----	-----	-----	10	2	2	0	0	0
Nebraska	1	1	1	4	-----	-----	6	11	8	1	0	0
Kansas	2	4	2	1	2	3	23	28	21	0	1	1
SO. ATL.												
Delaware	0	0	0	-----	-----	-----	1	2	2	0	0	0
Maryland [2]	6	1	1	1	1	1	15	147	13	4	2	2
Dist. of Col.	0	0	2	-----	-----	-----	8	14	14	0	0	0
Virginia	11	6	8	24	52	20	13	142	54	7	1	1
West Virginia	1	2	2	-----	6	9	5	24	11	0	1	1
North Carolina	1	7	11	-----	-----	-----	19	18	32	0	0	1
South Carolina	0	1	3	92	92	87	16	76	13	0	2	1
Georgia	1	4	8	8	1[illegible]	11	7	36	4	2	0	1
Florida	3	6	4	4	16	1	11	17	7	0	0	0
E. SO. CEN.												
Kentucky	1	3	2	-----	-----	-----	3	45	45	1	1	1
Tennessee	3	1	2	8	16	14	27	48	33	0	0	1
Alabama	4	5	7	11	3	7	9	32	26	3	3	3
Mississippi [2]	8	8	7	-----	-----	-----	-----	-----	-----	0	0	0
W. SO. CEN.												
Arkansas	3	0	3	5	5	10	31	27	8	0	0	0
Louisiana	1	2	7	1	-----	6	8	0	3	0	1	1
Oklahoma	2	2	2	4	7	7	6	20	9	0	0	0
Texas	27	27	23	79	345	74	94	101	90	3	1	1
MOUNTAIN												
Montana	0	0	0	9	-----	-----	25	3	11	0	0	0
Idaho	0	0	0	-----	-----	-----	34	2	4	0	0	0
Wyoming	0	2	0	15	5	-----	13	2	4	0	1	0
Colorado	2	13	10	13	14	2	39	30	20	1	0	0
New Mexico	1	0	0	2	1	-----	0	31	16	0	0	0
Arizona	5	3	1	1	23	13	7	69	36	0	0	0
Utah [2]	0	0	0	-----	1	-----	102	6	31	0	0	0
Nevada	0	0	-----	-----	-----	-----	9	2	-----	0	0	-----
PACIFIC												
Washington	1	1	1	-----	1	-----	177	5	11	0	0	0
Oregon	1	1	2	5	1	6	47	18	18	1	0	0
California	7	4	18	3	179	11	550	333	277	2	2	2
Total	137	145	213	327	807	318	2,739	3,319	2,999	45	28	34
29 weeks	6,756	6,818	10,879	79,322	487,389	158,339	461,421	817,274	344,403	2,188	1,299	1,299

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 25, 1942, and comparison with corresponding week of 1941 and 5-year median—Continued.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	July 25, 1942	July 26, 1941		July 25, 1942	July 26, 1941		July 25, 1942	July 26, 1941		July 25, 1942	July 26, 1941	
NEW ENG.												
Maine	1	0	0	1	4	4	0	0	0	0	2	2
New Hampshire	0	0	0	0	2	1	0	0	0	0	1	1
Vermont	2	0	0	0	0	0	0	0	0	1	3	0
Massachusetts	3	2	1	64	49	38	0	0	0	1	1	2
Rhode Island	0	0	0	0	3	3	0	0	0	0	0	0
Connecticut	0	2	1	4	7	7	0	0	0	0	1	1
MID. ATL.												
New York	2	11	7	74	70	75	0	0	0	9	12	10
New Jersey	4	2	1	16	25	24	0	0	0	2	3	5
Pennsylvania	3	8	1	42	38	77	0	0	0	10	10	15
E. NO. CEN.												
Ohio	1	11	7	79	49	39	0	1	1	13	4	6
Indiana	4	8	7	5	15	17	0	0	4	2	2	6
Illinois	12	4	4	43	55	87	0	0	4	3	15	15
Michigan [3]	7	7	7	39	53	76	1	0	1	1	2	2
Wisconsin	0	0	0	34	33	36	1	0	1	0	0	0
W. NO. CEN.												
Minnesota	0	5	1	42	12	19	0	0	6	1	0	1
Iowa	1	3	2	7	14	13	0	0	8	0	2	3
Missouri	2	0	0	15	55	18	0	0	0	2	5	21
North Dakota	1	0	0	2	1	1	0	0	4	0	0	0
South Dakota	0	0	0	11	1	8	0	0	1	1	0	0
Nebraska	0	2	1	1	6	3	1	0	0	1	1	0
Kansas	2	0	0	10	20	18	0	1	1	5	2	5
SO. ATL.												
Delaware	0	0	0	3	4	2	0	0	0	0	0	0
Maryland [3]	0	3	0	13	9	8	0	0	0	3	0	6
Dist. of Col.	0	1	0	7	3	3	0	0	0	0	0	2
Virginia	3	3	2	4	10	11	0	0	0	10	8	16
West Virginia	2	1	1	21	12	11	0	0	0	14	1	11
North Carolina	2	5	3	10	3	8	0	0	0	12	7	25
South Carolina	3	5	1	1	3	3	0	1	0	5	12	12
Georgia	4	79	3	7	3	7	0	0	0	26	13	38
Florida	1	16	1	0	3	3	0	0	0	1	13	5
E. SO. CEN.												
Kentucky	20	11	1	20	20	13	0	0	0	17	8	30
Tennessee	11	24	2	14	17	12	0	0	0	23	21	28
Alabama	3	58	1	5	10	8	0	0	0	8	9	9
Mississippi [2]	5	10	3	8	1	6	0	0	0	5	7	11
W. SO. CEN.												
Arkansas	15	2	1	1	1	1	0	0	0	19	14	26
Louisiana	3	2	3	3	7	5	0	0	0	14	14	33
Oklahoma	0	1	1	9	6	12	0	0	0	12	9	24
Texas	2	4	7	17	14	15	0	0	0	28	42	52
MOUNTAIN												
Montana	0	1	1	2	10	5	0	0	0	2	0	0
Idaho	0	0	0	4	4	3	0	0	0	1	0	0
Wyoming	0	1	1	0	1	1	0	0	0	0	0	1
Colorado	0	0	0	9	4	12	0	1	1	3	5	5
New Mexico	1	1	1	1	0	5	0	0	0	32	3	3
Arizona	0	0	0	1	1	2	0	1	1	1	1	2
Utah [2]	0	1	0	4	1	7	0	0	0	3	9	1
Nevada	0	0	------	0	0	------	0	0	------	1	0	------
PACIFIC												
Washington	0	0	0	4	8	10	0	0	0	3	[illegible]	2
Oregon	3	0	0	1	4	4	0	0	2	0	1	2
California	1	9	18	34	35	57	0	0	0	3	8	8
Total	124	303	139	692	706	814	3	5	46	298	272	464
29 weeks	875	1,489	1,163	86,642	87,381	113,489	596	1,127	7,693	3,144	3,473	5,065

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended July 25, 1942, and comparison with corresponding week of 1941—Continued

Division and State	Whooping cough, Week ended— July 25, 1942	Whooping cough, Week ended— July 26, 1941	Week ended July 25, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	22	30	0	0	0	0	0	0	0	0	0
New Hampshire	4	7	0	0	0	0	0	0	0	0	0
Vermont	50	1	0	0	0	0	0	0	0	0	0
Massachusetts	141	131	0	0	0	0	0	0	0	0	0
Rhode Island	22	44	0	0	0	0	0	0	0	0	0
Connecticut	67	57	0	0	1	0	0	0	0	0	0
MID. ATL.											
New York	341	279	0	5	5	0	5	0	0	0	1
New Jersey	254	115	1	3	0	0	0	0	1	0	0
Pennsylvania	274	322	0	0	0	0	1	0	0	0	0
E. NO. CEN.											
Ohio	183	326	0	0	0	0	0	0	2	0	0
Indiana	49	27	0	0	0	0	0	0	2	0	0
Illinois	415	146	0	4	26	0	2	0	1	0	0
Michigan [2]	170	234	0	0	4	0	1	0	0	0	0
Wisconsin	243	186	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	39	40	0	0	0	0	0	0	0	1	0
Iowa	30	25	0	0	0	0	2	0	4	0	0
Missouri	38	22	0	0	0	1	0	0	3	1	0
North Dakota	4	17	0	0	0	0	1	0	0	0	0
South Dakota	0	11	0	0	0	0	0	0	0	0	0
Nebraska	8	19	0	0	0	0	0	0	0	0	0
Kansas	47	117	0	1	1	0	0	0	0	0	0
SO. ATL.											
Delaware	2	1	0	0	0	0	0	0	0	0	0
Maryland [2]	46	76	0	0	0	5	0	0	6	0	0
Dist. of Col.	21	12	0	0	0	0	0	0	0	0	0
Virginia	46	46	0	0	0	209	0	0	7	0	0
West Virginia	20	13	0	0	0	0	0	0	0	0	0
North Carolina	116	184	0	0	0	0	0	0	2	0	3
South Carolina	49	100	0	0	0	0	0	0	0	1	4
Georgia	28	44	0	5	5	0	0	0	0	1	27
Florida	19	28	0	1	2	0	0	0	0	1	11
E. SO. CEN.											
Kentucky	84	72	0	0	5	0	0	0	1	1	0
Tennessee	31	76	0	1	0	14	0	0	2	1	0
Alabama	27	26	0	0	0	0	0	0	0	0	14
Mississippi [2]	—	—	0	0	0	0	0	0	0	0	1
W. SO. CEN.											
Arkansas	32	4	0	2	27	0	0	0	0	3	0
Louisiana	11	4	0	0	19	0	0	0	0	0	6
Oklahoma	4	18	0	0	0	0	0	0	0	0	0
Texas	164	232	0	7	241	0	0	0	0	1	69
MOUNTAIN											
Montana	27	6	0	0	0	0	0	0	0	2	0
Idaho	6	10	0	0	0	0	0	0	0	0	0
Wyoming	6	14	0	0	0	0	0	0	1	3	0
Colorado	15	113	0	0	0	0	0	0	0	0	0
New Mexico	13	19	0	0	2	0	0	0	0	0	0
Arizona	3	25	0	0	0	9	0	0	0	0	0
Utah [2]	19	82	0	0	0	0	0	0	0	3	0
Nevada	4	1	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	49	84	0	0	0	0	0	0	0	0	0
Oregon	17	34	0	0	0	0	0	0	1	0	0
California	146	435	0	2	3	0	0	0	0	2	2
Total	3,439	3,915	1	31	341	238	12	0	33	21	138
29 weeks	109,174	132,317									

[1] New York City only.

[2] Period ended earlier than Saturday.

PLAGUE INFECTION IN CALIFORNIA AND OREGON

Plague infection has been reported in specimens collected in California and Oregon as follows:

CALIFORNIA

Kern County: May 6, in a pool of 268 fleas from burrows of *C. beecheyi* ground squirrels on the El Tejon Ranch, 1 mile east of Lebec, Castac Lake area.

Lassen County: June 25 and 27, in tissue from 3 ground squirrels, *C. oregonus*, taken from Willow Creek Ranch, 7 miles north and 4½ miles east of Susanville.

Monterey County: June 18, in a pool of 151 fleas from 18 ground squirrels, *C. beecheyi*, taken from Fort Ord Military Reservation 12 miles southwest of Salinas; June 19, in a pool of 9 fleas from burrows of ground squirrels, *C. beecheyi*, in the same locality; July 2, in a pool of 80 fleas and 2 ticks from 39 pack rats, *Neotoma fuscipes*, taken on the Hunter Liggett Military Reservation, Coyote Road.

San Bernardino County: April 15, in a pool of 8 fleas from 5 "fuzz tail" ground squirrels, *C. leucurus* (?), taken from the Klinefelter Springs area, 7 miles west and 3 miles north of Needles.

San Luis Obispo County: In pools of fleas from ground squirrels, *C. beecheyi*, collected as follows: June 2, 143 fleas from 4 squirrels taken 12 miles east and 13 miles south of Arroyo Grande and 147 fleas from 14 squirrels taken 12 miles east and 5 miles south of Arroyo Grande; May 21 to June 12, 725 fleas from 64 squirrels taken on the Newhall Land and Farming Co. property, 2½ miles north and 8 miles east of Santa Maria; June 4, 77 fleas from 14 squirrels taken 12 miles east and 6 miles south of Arroyo Grande.

San Mateo County: June 9, in a pool of 7 fleas from 1 ground squirrel, *C. beecheyi*, taken from Skyland Boulevard, Alpine district; June 11, in a pool of 63 lice from 1 ground squirrel, same species, taken ½ mile east of Atherton.

Santa Barbara County: June 4, in a pool of 6 fleas from 1 ground squirrel, *C. beecheyi*, taken on the Newhall Land and Farming Co. property, 12 miles east and 2 miles north of Santa Maria, and a pool of 87 fleas from 6 ground squirrels of the same species taken in the same locality.

Santa Clara County: April 7, in a pool of 200 fleas from 46 ground squirrels, *C. beecheyi*, taken ½ mile north of Calero Dam; April 10, in a pool of 185 fleas from 14 ground squirrels, same species, taken in the same locality.

Ventura County: June 22, in a pool of 331 lice from 20 ground squirrels, *C. beecheyi*, taken from Padre Juan Canyon, 5 miles west and 1 mile north of Ventura; June 24, in a pool of 40 ticks from 3 cottontail rabbits, *Sylvilagus*, sp., taken 2 miles north of Somis and in a pool of 50 ticks from 2 rabbits, same species, taken 4 miles east of Somis.

OREGON

Malheur County: June 9, in a pool of 2 ticks from 1 badger, *Taxidea taxus neglecta*, taken 48 miles southwest of Jordan Valley on Highway No. 95.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 11, 1942

This table lists the reports from 90 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	1	0	1	0	2	0	0	0	0	1
Baltimore, Md	0	0	1	0	16	3	11	0	14	0	1	35
Barre, Vt	0	0	---	0	5	0	0	0	0	0	0	20
Billings, Mont	1	0	---	0	14	0	4	0	0	0	0	7
Birmingham, Ala	0	0	2	0	1	0	3	1	1	0	0	5
Boise, Idaho	0	0	---	0	5	0	0	0	0	0	0	0
Boston, Mass	0	0	---	0	103	3	3	0	23	0	0	48
Bridgeport, Conn	0	0	---	0	3	0	0	0	0	0	0	1
Brunswick, Ga	0	0	---	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	---	0	8	0	5	0	2	0	0	10
Camden, N. J	1	0	---	0	0	0	0	0	2	0	0	1
Charleston, S. C	0	1	---	0	2	0	0	0	0	0	0	0
Charleston, W. Va	0	0	---	0	0	0	0	0	0	0	0	0
Chicago, Ill	9	0	1	1	17	0	16	3	28	0	1	175
Cincinnati, Ohio	0	0	---	0	0	0	0	0	12	0	0	9
Cleveland, Ohio	0	0	---	0	5	0	2	0	15	0	0	41
Columbus, Ohio	0	0	---	0	9	0	1	0	1	0	0	20
Concord, N. H	0	0	---	0	1	0	0	0	0	0	0	2
Cumberland, Md	0	0	---	0	0	0	0	0	0	0	0	0
Dallas, Tex	0	0	---	0	0	0	0	0	1	0	1	10
Denver, Colo	2	0	5	0	20	0	3	0	1	0	0	8
Detroit, Mich	2	0	1	0	17	1	6	0	21	0	0	97
Duluth, Minn	0	0	---	0	3	0	3	0	1	0	0	4
Fall River, Mass	8	0		0	6	0	2	0	5	0	0	3
Fargo, N. Dak	0	0	---	0	1	0	1	0	0	0	0	1
Flint, Mich	0	0	---	0	0	0	3	0	1	0	1	5
Fort Wayne, Ind	0	0	---	0	0	0	1	0	0	0	2	5
Frederick, Md	0	0	---	0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	---	0	0	0	0	0	0	0	0	8
Grand Rapids, Mich	0	0	---	0	3	0	0	0	1	0	0	18
Great Falls, Mont	0	0	---	0	2	0	1	0	0	0	0	1
Hartford, Conn	0	0	---	0	25	0	1	0	2	0	0	14
Helena, Mont	0	0	---	0	1	0	0	0	0	0	0	0
Houston, Tex	1	0	---	0	3	0	4	0	0	0	0	1
Indianapolis, Ind	0	0	---	0	15	0	0	2	0	0	0	16
Kansas City, Mo	0	0	---	0	7	0	8	0	6	0	0	2
Kenosha, Wis	0	0	---	0	4	0	0	0	1	0	0	4
Little Rock, Ark	0	0		0	0	0	5	0	1	0	0	2
Los Angeles, Calif	4	0	3	2	59	1	10	1	6	0	0	10
Lynchburg, Va	0	0	---	0	0	0	1	0	0	0	0	15
Memphis, Tenn	0	0	---	0	3	0	4	0	2	0	1	25
Milwaukee, Wis	0	0	---	0	213	0	3	0	12	0	0	30
Minneapolis, Minn	4	1		0	22	0	6	0	7	0	1	9
Missoula, Mont	0	0		0	0	0	0	0	0	0	0	0
Mobile, Ala	0	0	1	0	0	0	0	0	1	0	0	4
Nashville, Tenn	0	0	---	0	0	0	1	0	1	0	0	4
Newark, N. J	0	0	1	0	42	1	0	1	5	0	0	[illegible]
New Haven, Conn	1	0	---	0	11	0	2	0	3	0	0	[illegible]
New Orleans, La	1	0	---	0	6	1	7	1	2	0	1	[illegible]
New York, N. Y	5	1	1	1	27	8	37	2	46	0	2	144
Omaha, Nebr	0	0	---	0	5	0	0	0	4	0	0	[illegible]
Philadelphia, Pa	0	0	---	0	21	1	13	0	28	0	1	[illegible]
Pittsburgh, Pa	0	0		0	4	0	12	1	5	0	2	[illegible]
Portland, Maine	0	0	---	0	25	4	0	0	0	0	0	[illegible]
Providence, R. I	0	0	---	0	49	0	1	0	1	0	0	[illegible]
Pueblo, Colo	0	0	---	0	0	0	0	0	0	0	0	[illegible]
Racine, Wis	0	0	---	0	20	0	0	0	1	0	0	[illegible]
Raleigh, N. C	0	0	---	0	0	0	0	0	0	0	0	[illegible]
Reading, Pa	0	0	---	0	1	0	0	0	0	0	0	[illegible]
Richmond, Va	0	0	---	0	6	0	2	0	0	0	0	[illegible]

City reports for week ended July 11, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va	0	0	----	0	0	0	0	0	0	0	0	0
Rochester, N. Y	0	0	------	0	4	0	1	0	3	0	0	6
Sacramento, Calif	3	0	-----	0	11	0	3	0	1	0	0	10
Saint Joseph, Mo	0	0	----	0	0	0	0	0	0	0	0	0
Saint Louis, Mo	0	0	1	0	5	1	4	2	2	0	1	8
Saint Paul, Minn	0	0	--	0	15	0	2	0	2	0	2	17
Salt Lake City, Utah	0	0	--	0	22	0	2	0	1	0	0	10
San Antonio, Tex	0	0	-	0	2	0	3	0	3	0	0	3
San Francisco, Calif	0	0	1	0	133	0	5	0	6	0	0	9
Savannah, Ga	0	0		0	0	0	0	0	0	0	0	6
Seattle, Wash	1	0	---	0	128	0	3	0	0	0	0	5
Shreveport, La	2	0	-	0	0	0	3	2	0	0	3	0
South Bend, Ind	0	0	--	0	1	0	0	0	2	0	0	7
Spokane, Wash	0	0	--	0	52	0	0	0	3	0	0	3
Springfield, Ill	0	0		0	0	0	1	0	1	0	0	0
Springfield, Mass	0	0		0	13	0	2	0	3	0	0	2
Superior, Wis	0	0	-	0	6	0	0	0	0	0	0	1
Syracuse, N. Y	0	0	----	0	146	0	1	0	0	0	0	31
Tacoma, Wash	0	0	---	0	22	0	0	0	0	0	0	4
Tampa, Fla	0	0		0	2	0	3	0	0	0	0	1
Terre Haute, Ind	0	0	-	0	0	0	2	0	0	0	0	0
Topeka, Kans	0	0		0	3	0	0	0	2	0	0	11
Trenton, N. J	0	0	--	0	1	0	4	0	0	0	0	0
Washington, D. C	2	0	----	0	11	0	11	0	11	0	0	22
Wheeling, W. Va	0	0	-----	0	2	0	0	0	0	0	0	3
Wichita, Kans	0	0	--	0	15	0	2	0	1	0	0	3
Wilmington, Del	0	0	---	0	1	1	1	0	1	0	1	2
Wilmington, N. C	0	0	--	0	0	0	1	0	0	0	0	10
Winston-Salem, N. C	0	0	-	0	0	0	0	0	0	0	0	3
Worcester, Mass	0	0		0	2	1	3	0	4	0	1	67

Anthrax.—Cases: Wilmington, Del., 1.
Dysentery, amebic.—Cases: Newark, 1; New York, 1.
Dysentery, bacillary.—Cases: Detroit, 4; Los Angeles, 3; Nashville, 3; New York, 2; Philadelphia, 1; Richmond, 15.
Tularemia.—Cases: Minneapolis, 1.
Typhus fever.—Cases: Charleston, S. C., 2; New Orleans, 2; Savannah, 2.

Rates (annual basis) per 100,000 population, for the group of 90 cities in the preceding table (estimated population, 1942, 34,134,198)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Week ended July 11, 1942	7.18	2.90	0.61	215.08	36.81	47.20	0.00	3.36	200.27
Average for week 1937–41	11.12	4.01	1.70	[1] 228.03	40.60	72.41	.62	6.02	203.94

[1] Median.

TERRITORIES AND POSSESSIONS

Puerto Rico

Poliomyelitis.—According to information dated July 27, 1942, 26 cases of poliomyelitis have been reported in Puerto Rico for the period June 22 to July 23, 1942, with 11 cases reported in the San Juan area. Three adults have been affected over the entire island.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended June 27, 1942.—During the week ended June 27, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	2	1	2		5		2		3	15
Chickenpox		2	21	102	270	18	84	11	77	585
Diphtheria		1	2	21	3	2	8	1		38
Dysentery				6						6
Encephalomyelitis							1			1
German measles					23		3	8	9	43
Influenza		3			2		2		3	10
Lethargic encephalitis							2			2
Measles		10	1	160	193	50	19	1	18	452
Mumps	1	25		65	286	18	97	27	275	794
Pneumonia		2			7				3	12
Poliomyelitis					1					1
Scarlet fever		14	13	44	130	12	29	51	27	320
Trachoma									1	1
Tuberculosis	2	8	13	59	53		23	3		161
Typhoid and paratyphoid fever			1	6	1					8
Undulant fever				1	3				1	5
Whooping cough		4	36	178	60	3	1		64	346
Other communicable diseases		6		3	215	3	1	1	3	232

COSTA RICA

Communicable diseases—May 1942.—During the month of May 1942, certain communicable diseases were reported in Costa Rica as follows:

Disease	Cases	Deaths
Diphtheria	24	
Measles	453	4
Typhoid and paratyphoid fever	13	1
Whooping cough	50	

CUBA

Habana—Communicable diseases—4 weeks ended June 28, 1942.—During the 4 weeks ended June 28, 1942, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	13		Scarlet fever	1	
Malaria	7		Tuberculosis	7	1
Measles	22	1	Typhoid fever	39	11
Poliomyelitis	10				

FINLAND

Communicable diseases—April 1942.—During the month of April 1942, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	112	Poliomyelitis	1
Dysentery	6	Scarlet fever	482
Influenza	1,230	Typhoid fever	116
Paratyphoid fever	171		

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January–April 1942	May 1942	June 1942—week ended—			
				6	13	20	27
ASIA							
Ceylon	C	61	11	3			
India	C	23,420	4,661				
Calcutta	C	346	344	57	75		
Chittagong	C	36	15		4		
Rangoon	C	1					
India (French)	C	10					

PLAGUE

[C indicates cases; P, present]

Place		January–April 1942	May 1942	June 1942—week ended—			
				6	13	20	27
AFRICA							
Basutoland	C	10					
Belgian Congo	C		2				
British East Africa:							
Kenya	C	363					
Nairobi	C	62					
Uganda	C	178					
Egypt: Port Said	C					1	
Madagascar	C	78	6				
Morocco	C	130	93	20	25		
Union of South Africa	C	50	5				
ASIA							
China [1]							
India	C	385					
Indochina (French)	C	67	3				
Palestine: Haifa	C	4					
SOUTH AMERICA							
Argentina: Cordoba Province	C	7					
Brazil:							
Alagoas State	C	3					
Pernambuco State	C	6					
Chile: Valparaiso	C	1					
Peru:							
Ancash Department	C	6					
Lambayeque Department	C	3					
Libertad Department	C	6					
Salaverry—Plague infected rats		P					
Lima Department	C	36	13				
Lima	C		12				
Piura Department	C	13	1				
OCEANIA							
Hawaii Territory: Plague-infected rats		17	2		1	2	

[1] Plague has been reported in China as follows: Chekiang Province, Apr. 1–10, 1942, 4 cases; Fukien Province, Jan. 1–Apr. 5, 1942, plague appeared in 11 localities; Hunan Province, week ended Apr. 18, 1942, 2 cases; Suiyuan Province, pneumonic plague appeared in epidemic form during the period Jan. 1–Apr. 4, in the northwestern area.

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases]

Place		January–April 1942	May 1942	June 1942—week ended— 6	13	20	27
AFRICA							
Algeria	C	394	56				
Belgian Congo	C	249					
British East Africa: Tanganyika	C	11					
Dahomey	C	52	1				
French Guinea	C	67	1		2	5	
Gold Coast	C	1,075					
Ivory Coast	C	50					
Morocco	C	1,050	101	15	27		
Nigeria	C	872	344	26	14	9	
Niger Territory	C	437	29		17	26	
Senegal	C	9	5				
Sudan (French)	C	4	28		18	94	
Tunisia	C	1					
Union of South Africa	C	556	4	7			
Zanzibar	C	[1] 2					
ASIA							
Ceylon	C	4	2	1			
China	C	7	1				
India	C	12,652	3,237				
Indochina (French)	C	1,907	494		87		
Iran	C	28					
Iraq	C	180	23				
Trans-Jordan	C	2					
EUROPE							
France:							
Seine Department	C	41	3				
Unoccupied zone	C	13					
Great Britain.							
England and Wales.[2]							
Scotland [2]	C			1	[1] 2		
Portugal	C	27	8	1			
Spain	C	122	33	8			
NORTH AMERICA							
Canada	C	2					
Mexico	C	24					
SOUTH AMERICA							
Brazil	C			1			
British Guiana	C	1					
Colombia	C	197					
Venezuela (alastrim)	C	84	4				

[1] Imported.

[2] Smallpox was also reported in Great Britain as follows· Week ended July 4, 1942, 3 cases in Swindon, South, Central England. Information dated July 2, 1942, states that a total of 26 cases of smallpox with 3 deaths has occurred in Glasgow, and 1 case in Ardrossan, Ayrshire, Scotland.

TYPHUS FEVER

[C indicates cases; P, present]

Place		January–April 1942	May 1942	June 1942—week ended— 6	13	20	27
AFRICA							
Algeria	C	23,328	5,975				
Basutoland	C	15					
British East Africa: Kenya	C	4					
Egypt	C	12,633	4,270	662	639		
Ivory Coast	C	4					
Morocco	C	14,962	5,070	854	832	820	
Niger Territory	C	1					
Senegal	C		[1] 3				
Sierra Leone	C	5	2				
Tunisia	C	10,100	2,844	725			
Union of South Africa	C	472	35				
ASIA							
China	C	52					
India	C	6					
Iran	C	260	60				
Iraq	C	15	51	8			
Palestine	C	19	3				
Syria	C	22					
Trans-Jordan	C	5					

[1] Suspected.

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; P, present]

Place		January–April 1942	May 1942	June 1942—week ended— 6	13	20	27
EUROPE							
Bulgaria	C	405	157		7	10	
Czechoslovakia	C	5					
France:							
Seine Department	C	1					
Unoccupied zone	C	216	10				
Germany	C	85					
Hungary	C	501	86	20	22		
Irish Free State	C	3	5	1			
Portugal	C	1					
Rumania	C	2,502	575	72	78	52	22
Spain	C	3,614	196	13			
Canary Islands	C	1					
Turkey	C	P	P	P	27	10	8
Union of Soviet Socialist Republics	C	67					
NORTH AMERICA							
Guatemala	C	44	50				
Jamaica	C	15	8				
Mexico	C	253	1				
Panama Canal Zone	C	1					
Puerto Rico	C	3					
SOUTH AMERICA							
Chile	C	23	13				
Ecuador	C	14					
Venezuela	C	7					
OCEANIA							
Australia	C	13	5				
Hawaii Territory	C	21	3		1		

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January–April 1942	May 1942	June 1942—week ended— 6	13	20	27
AFRICA							
Belgian Congo: Libenge	D	[1] 1					
British East Africa: Kenya	C		1				
French West Africa	C	1					
Gold Coast	C	1			[1] 1		
Ivory Coast	C	1	[1] 1				
Senegal.[2]							
Sierra Leone: Freetown	C	2					
Sudan (French)	D	[1] 1					
Togo: Hohoe	C	1					
SOUTH AMERICA [3]							
Brazil: Acre Territory	D	4					
Colombia:							
Boyaca Department	D	2					
Intendencia of Meta	D	1					
Santander Department	D	1	1				

[1] Suspected.

[2] According to information dated Feb. 9, 1942, 15 deaths from yellow fever among Europeans have occurred in Senegal.

All yellow fever in South America is of the jungle type unless otherwise specified.

* * *

COURT DECISION ON PUBLIC HEALTH

Garbage—collection—granting of exclusive right by city upheld.—(Washington Supreme Court; *City Sanitary Service Co.* v. *Rausch et ux.*, 117 P.2d 225; decided September 22, 1941.) The city of Wenatchee passed a garbage ordinance and a few days later entered into a contract with the plaintiff corporation wherein the city granted to the plaintiff the exclusive right to collect garbage within the city for a period of nearly 10 years. The ordinance contained a provision making it unlawful for any person, firm, or corporation to haul or carry garbage on any public street except on those authorized by the city. After the ordinance was passed and the contract executed the defendants continued to collect garbage in the city as they had done prior thereto, and the plaintiff company brought an action to restrain them from so doing. The Supreme Court of Washington affirmed the decree of the lower court permanently enjoining the defendants from doing the thing of which the plaintiff complained.

Among other things, the supreme court held (a) that the ordinance did not grant a franchise, (b) that the city had the right, in the interest of the public health and welfare, to provide by ordinance for the collection and disposition of garbage, even though some things that are classified as garbage have elements of value, and that the ordinance was not invalid under certain provisions of the Federal and State constitutions, and (c) that under certain statutory provisions conferring power upon cities of the second class, of which Wenatchee was one, the city clearly was given power to pass an ordinance and make a contract for the collection and disposition of garbage.

Sewage disposal—stream pollution—liability of city.—(Washington Supreme Court; *Snavely et ux.* v. *City of Goldendale et al.*, 117 P.2d 221; decided September 22, 1941.) The plaintiffs, who were riparian owners, sought to recover damages resulting from the pollution of a stream. The defendants were the city of Goldendale and certain persons who operated a slaughterhouse on the bank of the stream within the city. The plaintiffs alleged, with respect to the city, that the latter had discharged raw sewage into the stream so as to pollute the water and render it unfit for domestic use and deleterious to health. The trial court sustained demurrers to the complaint and the plaintiffs appealed to the Supreme Court of Washington. One of the grounds on which the demurrers were based was that the complaint did not state facts sufficient to constitute a cause of action against the defendant city.

In considering this ground the supreme court said that whether the complaint stated a cause of action against the city depended upon the character of the cause of action set up. If the action sounded in

tort, said the court, the complaint was defective because it contained no allegation that a claim had been presented to the city council in compliance with a statutory requirement, but, if, however, the cause of action sprang from the constitutional guaranty that no private property should be taken or damaged for public or private use without just compensation having been first made, such an allegation was not essential in the statement of the cause of action. The court held that the complaint stated a cause of action against the city under the constitutional provision mentioned and quoted from a Connecticut case wherein it was said:

> "The right to pour into the river surface drainage does not include the right to mix with that drainage noxious substances in such quantities that the river cannot dilute them, nor safely carry them off without injury to the property of others. The latter act is in effect an appropriation of the bed of the river as an open sewer, and the proposition that it may become lawful by reason of necessity is inconsistent with undoubted axioms of jurisprudence. The appropriation of the river to carry such substances to the property of another is an invasion of his right of property. When done for a private purpose, it is an unjustifiable wrong. When done for a public purpose, it may become justifiable, but only upon payment of compensation for the property thus taken. Public necessity may justify the taking, but cannot justify the taking without compensation. * * * But, however great the necessity may be, it can have no effect on the right to compensation for property taken. * * *"

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Fluoride Domestic Water and Dental Caries Experience

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Public Health Reports

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DOMESTIC WATER AND DENTAL CARIES [1]

V. Additional Studies of the Relation of Fluoride Domestic Waters to Dental Caries Experience in 4,425 White Children, Aged 12 to 14 Years, of 13 Cities in 4 States

By H. TRENDLEY DEAN, *Dental Surgeon*, FRANCIS A. ARNOLD, Jr., *Passed Assistant Dental Surgeon*, and ELIAS ELVOVE, *Senior Chemist*, *United States Public Health Service* (with clinical examinations by *Assistant Dental Surgeons* (R) David C. Johnston and Edwin M. Short)

Recent reports (*1*, *2*) have pointed out an inverse relationship between the fluoride content of the public water supply and the dental caries experience of those children continuously using such waters throughout life. A further study of this phenomenon has been made in 21 cities of 4 States where the public water supplies varied not only in fluoride content but with respect to other mineral constituents as well.

A portion of this investigation—a study of 2,832 children in 8 suburban Chicago communities—has recently been reported (*3*). The present paper records the findings observed in 4,425 additional children of 13 other cities, bringing the total number of white urban school children, aged 12 to 14 years, examined to 7,257. All were examined by one or the other of two dental examiners (D. C. J. and E. M. S.), each examining approximately an equal number of children in each city.

The same methods used in the study of the 8 suburban Chicago communities with respect to age, sex, color, continuity of exposure, and other epidemiological factors discussed in detail in that report (*3*) were followed in the study of the 13 additional cities which form

[1] From the Division of Infectious Diseases with the cooperation of the Division of Chemistry, National Institute of Health. Preceding papers in this series are

Dean, H T., Jay, P., Arnold, F. A., Jr., and Elvove, E Domestic water and dental caries. I. A dental caries study, including *L. acidophilus* estimations, of a population severely affected by mottled enamel and which for the past 12 years has used a fluoride-free water. Pub. Health Rep., 56: 365-381 (1941)

Dean, H. T., Jay, P., Arnold, F. A., Jr., and Elvove, E.: Domestic water and dental caries II. A study of 2,832 white children, aged 12 to 14 years, of 8 suburban Chicago communities, including *Lactobacillus acidophilus* studies of 1,761 children. Pub. Health Rep., 56: 761-792 (1941).

McClure, F. J.: Domestic water and dental caries. III. Fluorine in human saliva. Am. J. Dis. Child., 62: 512 (1941).

Arnold, F. A., Jr., Dean, H. T., and Elvove, E.: Domestic water and dental caries. IV. Effect of increasing the fluoride content of a common water supply on the *Lactobacillus acidophilus* counts of the saliva. Pub Health Rep., 57: 773-780 (1942).

the basis of this paper. For purposes of summarizing these field findings in the discussion which follows later in this paper, certain data from the study of 8 suburban Chicago communities will be included with that of the 13 additional cities which form the basis of this report.

The study of the 8 suburban Chicago communities showed, in part, that the continuous use of a domestic water, the fluoride content of which was close to the minimal threshold of endemic dental fluorosis (mottled enamel), was associated with a relatively low dental caries experience. For example, at Aurora (Ill.), where the domestic water contained 1.2 p. p. m.[2] of fluoride (F) and where a relatively low dental caries prevalence was recorded, mottled enamel as an esthetic problem was not encountered. Strong presumptive evidence suggests that the factor or factors responsible for this increased freedom from dental caries is the fluoride content of the domestic water; the fact that it was operative at concentration levels so low that mottled enamel ceased being an accessory complication was a finding of first importance.

When it was also apparent that all three cities using fluoride-free waters were characterized by relatively high dental caries prevalence, it seemed likely that fluoride levels under 1.0 p. p. m. of fluoride (F) might also influence the intensity of dental caries attack.[3] The study was therefore extended to include certain additional cities whose water supplies contained fluorides in these lower concentration levels.

This paper describes studies made in Illinois, Indiana, Ohio, and Colorado, and reports the amount of dental caries experience found associated with the continuous use of common water supplies obtained from Lake Michigan, the Mississippi, Ohio, and Arkansas Rivers, from deep wells of different fluoride concentration and mineral composition, and in one instance from melted snow high on Pike's Peak (Colorado Springs).

This survey immediately followed the study of the 8 suburban Chicago communities previously reported (*3*), all clinical examinations being made by the same two dental examiners. With the exception of Kewanee[4] (Ill.), all examinations were made during 1940. The order in which these cities were studied was: Kewanee (Ill.); Zanesville, Portsmouth, Middletown, Marion, and Lima (Ohio); Elkhart

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[2] P. p. m.=parts per million

[3] The term "intensity of dental caries attack" as used in this paper may be defined as the force of the factors responsible for the initiation (or inhibition) and rate of progress (or quiescence) of the dental caries process This force of attack (or force of resistance) is subject to considerable change dependent upon varying circumstances.

[4] Examinations in Kewanee were made in December 1939. The chronological order in which the clinical examinations were made in 1940 was as follows. Zanesville and Portsmouth (January); Middletown (January-February), Marion and Lima (February); Elkhart and Michigan City (March); Colorado Springs (April), Pueblo (May), Quincy (September); Galesburg (September-October); and East Moline (October).

and Michigan City (Ind.); Colorado Springs and Pueblo (Colo.), and Quincy,[5] Galesburg,[5] and East Moline (Ill.).

In the tables to follow these 13 cities will be listed in accordance with the increasing order of observed dental caries experience rates which are: Galesburg (Ill.); Colorado Springs (Colo.); East Moline (Ill.); Kewanee (Ill.); Pueblo (Colo.); Marion, Lima, and Middletown (Ohio); Quincy (Ill.); Zanesville and Portsmouth (Ohio), and Elkhart and Michigan City (Ind.).

Population of cities studied.—Population statistics with respect to the 13 cities studied are given in table 1. As the study was limited to white school children, the percentage of native white was computed on the basis of the total white population, not the total population. Briefly, it shows that at Galesburg, Colorado Springs, East Moline, Kewanee, Pueblo, Marion, Lima, Middletown, Quincy, Zanesville, Portsmouth, Elkhart, and Michigan City the percentage of the native white of the white population was: 92.0, 93.2, 78.9, 85.9, 89.5, 97.7, 96.4, 96.2, 95.7, 97.2, 98.4, 94.9, and 87.1, respectively.

Climatological data (sunshine).—Weather Bureau reports list the number of clear, partly cloudy, and cloudy days[6] as recorded at stations located at or near the cities included in this study. To estimate roughly the amount of sunshine present in these cities the Weather Bureau recordings for clear, partly cloudy, and cloudy days were divided dichotomously into "clear" and "nonclear" days, the term "clear days" as used in this paper being defined as the number of clear days reported by the Weather Bureau plus one-half the number of days listed as partly cloudy. The average number of "clear days" and the percentage of "clear days" per year was determined for the 15-year period covering approximately the life span of the children examined and is shown in table 2. Certain of these values were obtained from stations located in the city studied. Where this was not possible the values recorded at the nearest seemingly comparable city are given and in some cases where two stations were about equidistant, an arithmetic mean of the reports from both stations. These data are shown in table 2.

In connection with the alleged influence of sunshine on dental caries prevalence, it might be noted that cities characterized by high dental caries experience, e. g., Portsmouth and Middletown, show percentages of "clear days" as high or higher than that of Galesburg, a city where a very low dental caries prevalence was observed.

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[5] The children of Galesburg and Quincy were examined in December 1939, by Dental Surgeon H. T. Dean, U. S. Public Health Service, and Dr. O. S. Hoag, Illinois Department of Public Health, as reported in reference (2). Because of the variation in diagnostic criteria of different dental examiners, the children of Galesburg and Quincy were again examined in September and October 1940, by Assistant Dental Surgeons (R) Johnston and Short in order that all dental caries experience reported in this paper might be on a comparable basis of diagnostic standards.

[6] A day is classified clear, partly cloudy, or cloudy on the basis of hourly estimations, sunrise to sunset, as follows: Clear, sky averages three-tenths or less obscured; partly cloudy, sky averages four-tenths to seven-tenths inclusive, obscured, and cloudy, sky averages more than seven-tenths obscured.

TABLE 1.—*Statistics with respect to the composition of the population of the 13 cities studied (census of 1930)*

City	Population								
	Total	White	Negro	Other races [1]	Total	White	Negro	Other races [1]	Percent native white of white population
	Number				Percent				
Galesburg, Ill	28,830	27,671	891	268	100 0	95 98	3 09	0 93	92.0
Colorado Springs, Colo	33,237	31,828	965	444	100 0	95 76	2 90	1.34	93 2
East Moline, Ill	10,107	9,462	470	175	100.0	93.62	4.65	1.73	78.9
Kewanee, Ill	17,093	16,720	278	95	100 0	97.82	1 63	55	85 9
Pueblo, Colo	50,096	45,131	1,305	3,660	100.0	90 10	2 60	7.30	89 5
Marion, Ohio	31,084	30,690	387	7	100 0	98 73	1 25	02	97.7
Lima, Ohio	42,287	40,848	1,422	17	100 0	96 60	3 36	04	96.4
Quincy, Ill	39,241	38,062	1,145	34	100 0	97.00	2 92	.08	96.2
Middletown, Ohio	29,992	27,186	2,805	1	100 0	90 64	9.35	.01	95.7
Zanesville, Ohio	36,440	34,659	1,776	5	100 0	95 11	4 87	.02	97.2
Portsmouth, Ohio	42,560	40,658	1,891	11	100 0	95 53	4 44	.03	98.4
Elkhart, Ind	32,949	32,394	539	16	100 0	98 31	1 64	05	94 9
Michigan City, Ind	26,735	25,533	1,071	131	100 0	95.50	4.00	.50	87.1

[1] Although the Negro was excluded from this study because of the possibility of a racial difference in attack by dental caries, no attempt was made to eliminate children of "Other races" This segment of the population comprised a relatively small percentage of the general population (1.2 percent) of the 13 cities studied, and it seemed unnecessary to eliminate the occasional child who may have belonged in this classification They are, accordingly, included with the white children in the tables that follow in this paper Persons of Mexican birth or parentage who were not definitely reported as white or Indian were designated "Mexican" in the 1930 census and included in the general class of "Other races" In previous censuses most of the Mexicans have been classified as white Of the 4,594 persons listed in this column, East Moline and Kewanee (Ill.) excluded, 4,356, or close to 95 percent, were Mexicans

TABLE 2.—*A 15-year summary (1925–39) of the actual, or estimated, average number of "clear days" per year recorded for the 13 cities studied*

(From Climatological Data, Weather Bureau)

City	Number of days		Number of clear days [2] (A+B)	Number of years of observation	Clear days		Increasing order of—	
	Clear [1]	½ partly cloudy [1]			Average per year $\left(\frac{C}{D}\right)$	Percent $\frac{E}{365}$	Dental caries experience	Percent of clear days [2]
	A	B	C	D	E			
Galesburg, Ill	2,625	556	3,181	15	212.1	58 1	1	9
Colorado Springs, Colo	3,040	791	3,831	15	255 4	70 0	2	13
East Moline, Ill	2,053	810	2,863	15	190 9	52 3	3	3
Kewanee, Ill	2,612	625	3,237	15	215 8	59 1	4	10
Pueblo, Colo	2,489	1,094	3,583	15	238 9	65 5	5	12
Marion, Ohio	1,415	1,004	2,419	15	161 3	44 2	6	1
Lima, Ohio	2,190	707	2,897	15	193 1	52 9	7	4
Quincy, Ill	2,508	563	3,071	15	204 7	56 1	8	6
Middletown, Ohio	2,688	695	3,383	15	225 5	61 8	9	11
Zanesville, Ohio	2,491	603	3,094	15	206 3	56.5	10	7
Portsmouth, Ohio	2,818	360	3,178	15	211 9	58.1	11	8
Elkhart, Ind	1,811	758	2,569	15	171.3	46 9	12	2
Michigan City, Ind	2,615	454	3,069	15	204 6	56 1	13	5
Total	31,355	9,020	40,375	195	207.1	56.7		

[1] "Clear days" and "partly cloudy days" as defined by the Weather Bureau. (See footnote 6, p. 1155.)
[2] "Clear days" as defined in text.

Selection of study groups.—The study groups were selected in a manner described in detail in a previous report (*3*). *The groups*

examined generally represent all 12-, 13-, and 14-year-old white public[7] *school children continuously exposed to the variable under investigation (the public water supply).* All public schools in the community having a seventh, eighth, or ninth grade were included in the study, but no effort was made to locate 12- to 14-year-old children in grades other than the three specified, with the exception of those instances where an appreciable number of children of the age group studied were in the sixth grade.

At Kewanee, Zanesville, and Portsmouth the selection was done by the same individual (H. T. D.) as in the study of the 8 suburban Chicago communities. In the other 10 cities the selection was carried out by the two dental examiners (D. C. J. and E. M. S.) in a manner similar to that followed in the cities previously studied. Table 3 shows the number of 12- to 14-year-old pupils present the day the study group was selected and the number and percentage of these whose histories on repeated questioning indicated continuity of exposure and who were examined.

TABLE 3.—*Summary of data with relation to continuity of exposure to the public water supply of 4,425 selected white children, aged 12 to 14 years, residing in 13 cities of Illinois, Indiana, Ohio, and Colorado*

City	Number of 12- to 14-year-old children in attendance on the day study group was selected	Number of 12- to 14-year-old white children whose histories on repeated questioning[1] indicated continuity of exposure and who were examined	Percentage of the total present who were examined
Galesburg, Ill	916	273	29.7
Colorado Springs, Colo	1,444	404	28.0
East Moline, Ill	352	152	43.2
Kewanee, Ill	522	123	23.6
Pueblo, Colo	1,412	614	43.5
Marion, Ohio	1,010	263	26.0
Lima, Ohio	1,411	454	32.2
Middletown, Ohio	1,013	370	36.5
Quincy, Ill	1,063	330	31.0
Zanesville, Ohio	1,248	459	36.8
Portsmouth, Ohio	1,228	469	38.2
Elkhart, Ind	942	278	29.5
Michigan City, Ind	654	236	36.1
Total	13,217	4,425	33.5

[1] About 14 percent of the group (5,127) for whom sampling cards were made out were not examined. The detailed subsequent questioning which disclosed breaks in continuity of exposure warranting elimination from the study accounted for about half of the cases excluded (7 percent) and these together with those absent on the day of examination (2.5 percent), colored (4 percent), and miscellaneous comprised the 14 percent referred to.

Clinical examinations.—All clinical examinations were made in a manner similar to that followed in the study of the 8 suburban Chicago communities (*3*), and by the same two dental examiners.

[7] At Colorado Springs and East Moline children of the parochial schools were examined in addition to the public school children.

CLINICAL FINDINGS

In table 4 are shown the number of children examined, the age distribution, the number and percentage of children with one or more permanent teeth[8] showing dental caries experience, the number and percentage of children with no dental caries experience, and the total dental caries experience (permanent teeth) observed in each city.

TABLE 4.—*Prevalence of dental caries experience, permanent teeth, in 4,425 selected white school children, aged 12 to 14 years, classified by cities, according to (a) age distribution, the number and percent of children showing dental caries experience, and (b) the amount of dental caries experience*

City	Number of children examined: All ages	Age in years last birthday: 12	13	14	Children showing—: Dental caries experience	No dental caries experience	Permanent teeth showing dental caries experience
	Number						
Galesburg, Ill	273	89	100	84	197	76	643
Colorado Springs, Colo	404	143	137	124	289	115	994
East Moline, Ill	152	54	58	40	121	31	461
Kewanee, Ill	123	42	40	41	101	22	422
Pueblo, Colo	614	188	253	173	549	65	2 528
Marion, Ohio	263	88	78	97	248	15	1 461
Lima, Ohio	454	147	148	159	444	10	2 962
Middletown, Ohio	370	116	141	113	363	7	2 601
Quincy, Ill	330	100	125	105	322	8	2 329
Zanesville, Ohio	459	147	175	137	447	12	3 366
Portsmouth, Ohio	469	128	177	164	463	6	3 622
Elkhart, Ind	278	79	122	77	274	4	2 289
Michigan City, Ind	236	77	84	75	236	0	2 448
	Percent						Number per 100 children examined
Galesburg, Ill		32.6	36.6	30.8	72.2	27.8	236
Colorado Springs, Colo		35.4	33.9	30.7	71.5	28.5	246
East Moline, Ill		35.5	38.2	26.3	79.6	20.4	303
Kewanee, Ill		34.2	32	33.3	82.1	17.9	343
Pueblo, Colo		30.6	41.2	28.2	89.4	10.6	412
Marion, Ohio		33.5	29.6	36.9	94.3	5.7	556
Lima, Ohio		32.4	32.6	35.0	97.8	2.2	652
Middletown, Ohio		31.4	38.1	30.5	98.1	1.9	703
Quincy, Ill		30.3	37.9	31.8	97.6	2.4	706
Zanesville, Ohio		32.0	38.1	29.9	97.4	2.6	733
Portsmouth, Ohio		27.3	37.7	35.0	98.7	1.3	772
Elkhart, Ind		28.4	43.9	27.7	98.6	1.4	823
Michigan City, Ind		32.6	35.6	31.8	100.0	0.0	1 037

The amount of dental caries in the populations studied is expressed quantitatively in terms of the total caries experience[9] of the group. This is determined by totaling the number of filled teeth (past dental caries), the number of teeth with untreated dental caries (irrespective of the number of defects per tooth), the number of teeth indicated for

[8] All data in the tables to follow refer to permanent teeth only.

[9] This method of reconstituting the complete caries experience in the permanent teeth of children with a fair degree of precision has been described by Klein and Palmer in Pub. Health Bulletin No. 239, reference (4) this paper, and other publications. Although the method of estimating the total amount of past and present dental caries described in this paragraph deals with teeth *per se*, similar criteria may be applied in measuring dental caries prevalence for tooth surfaces as may be seen in table 7 of this paper.

extraction, and the number of missing teeth.[10] In computing this index, no single tooth was counted more than once even though one surface may have shown a carious lesion and another surface a filling.[11] To express the dental caries experience (teeth) in terms of a rate per hundred children examined, the sum of the four aggregates referred to is divided by the number of children examined and the quotient multiplied by 100. These data are given in table 4.

In addition to reporting the total dental caries experience, it seems desirable to show how much each of the following items contributed to the rates shown: Filled teeth (past dental caries), teeth with untreated dental caries, teeth in which extraction is indicated, and missing teeth (teeth lost because of accident or extracted because of malposition excluded). These data are shown in table 5.

TABLE 5.—*Summary of the dental caries experience in the permanent teeth of 4,425 white school children, aged 12 to 14 years, of 13 cities in Illinois, Indiana, Ohio, and Colorado, classified on the basis of filled teeth (past dental caries), teeth with untreated dental caries, extraction indicated, and missing teeth (presumably because of dental caries)*

City	Children examined	Dental caries experience, permanent teeth				
		Filled teeth (past dental caries) (a)	Teeth with untreated dental caries (b)	Extraction indicated (c)	Missing teeth (d)	Total (a+b+c+d)
(A) NUMBER						
Galesburg, Ill	273	217	385	15	26	643
Colorado Springs, Colo	404	240	734	5	15	994
East Moline, Ill	152	103	334	9	15	461
Kewanee, Ill	123	77	308	9	28	422
Pueblo, Colo	614	377	2,017	48	86	2,528
Marion, Ohio	263	213	1,175	17	56	1,461
Lima, Ohio	454	653	2,037	59	213	2,962
Middletown, Ohio	370	653	1,687	41	220	2,601
Quincy, Ill	330	917	1,167	75	170	2,329
Zanesville, Ohio	459	908	1,961	156	341	3,366
Portsmouth, Ohio	469	1,202	2,041	108	271	3,622
Elkhart, Ind	278	789	1,404	25	71	2,289
Michigan City, Ind	236	770	1,463	61	154	2,448
(B) NUMBER PER 100 CHILDREN EXAMINED						
Galesburg, Ill		79.5	141.0	5.5	9.5	236
Colorado Springs, Colo		59.4	181.7	1.2	3.7	246
East Moline, Ill		67.8	219.7	5.9	9.9	303
Kewanee, Ill		62.6	250.4	7.3	22.8	343
Pueblo, Colo		61.4	328.5	7.8	14.0	412
Marion, Ohio		81.0	446.8	6.5	21.3	556
Lima, Ohio		143.8	448.7	13.0	46.9	652
Middletown, Ohio		176.5	455.9	11.1	50.5	703
Quincy, Ill		277.9	353.6	22.7	51.5	706
Zanesville, Ohio		197.8	427.2	34.0	74.3	733
Portsmouth, Ohio		256.3	435.2	23.0	57.8	772
Elkhart, Ind		283.8	505.0	9.0	25.5	823
Michigan City, Ind		326.3	619.9	25.8	65.3	1,037

[10] In this study third molars are excluded from consideration; the occasional instance of teeth lost by accident or extracted because of malposition is also excluded.

[11] In this study a tooth showing both an untreated lesion and a filling was counted as a "filled tooth."

Proximal dental caries.[12]—Outstanding differences in the amount of dental caries in the proximal surfaces of the four superior permanent incisors have been reported (*2*, *3*). For instance, in the study of 8 suburban Chicago communities, there was 14.3 times as much of this type of caries in the 1,008 children using fluoride-free waters (Evanston, Oak Park, and Waukegan) as was observed in the 1,421 children using a water whose fluoride (F) content exceeded 1.0 p. p. m. (Elmhurst, Maywood, Aurora, and Joliet).

The dental caries experience of the eight proximal surfaces of the four superior permanent incisors in the children of the 13 cities included in this report are shown in table 6.

TABLE 6.—*Summary of the findings relative to the dental caries experience, proximal surfaces, of the four superior permanent incisors of 4,425 selected white school children, aged 12 to 14 years, of 13 cities*

City	Number of children examined	Dental caries experience, proximal surfaces, superior permanent incisors				
		Children showing 1 or more surfaces with dental caries experience		Total number of proximal surfaces [1]	Number of proximal surfaces with dental caries experience [2]	Dental caries experience per 100 surfaces
		Number	Percent			
(A) CITIES WHOSE WATER SUPPLIES CONTAINED 0.5 P. P. M. OR MORE OF F.						
Galesburg, Ill	273	9	3.3	2,162	10	0.46
Colorado Springs, Colo	404	5	1.2	3,186	10	.31
East Moline, Ill	152	2	1.3	1,214	2	.16
Kewanee, Ill	123	6	4.9	976	14	1.4
Pueblo, Colo	614	12	2.0	4,854	23	.47
Total	1,566	34	2.2	12,392	59	.48
(B) CITIES WHOSE WATER SUPPLIES CONTAINED LESS THAN 0.5 P. P. M. OF F.						
Marion, Ohio	263	34	12.9	2,076	69	3.3
Lima, Ohio	454	52	11.5	3,580	113	3.2
Middletown, Ohio	370	78	21.1	2,904	205	7.1
Quincy, Ill	330	100	30.3	2,596	291	11.2
Zanesville, Ohio	459	136	29.6	3,618	412	11.4
Portsmouth, Ohio	469	136	29.0	3,704	386	10.4
Elkhart, Ind	278	86	30.9	2,208	248	11.2
Michigan City, Ind	236	101	42.8	1,874	339	18.1
Total	2,859	723	25.3	22,560	2,063	9.1
Grand total	4,425	757	17.1	34,952	2,122	6.1

[1] Teeth lost by accident, unerupted, extracted because of malposition, and proximal surfaces restored by prosthesis (inlays, ¾ crowns, etc.) because of traumatic injury, excluded. The maximum possible number of surfaces in a population of this size (4,425) is 35,400. The number of surfaces excluded for the reasons stated was 448, or approximately 1.3 percent.

[2] Teeth listed as "extraction indicated" and "missing," not covered by the foregoing exceptions, were assumed to have had both surfaces attacked by caries and were so counted. These, together with the number of filled proximal surfaces (past caries) and the number of proximal surfaces with untreated carious lesions constitute the complete caries experience.

Marked differences were noted in the amount of this type of dental caries between the 8 cities whose public water supplies contained less than 0.5 part per million of fluoride (F) and the 5 cities whose water

[12] For those unfamiliar with dental nomenclature proximal caries is defined as that type of dental caries which ordinarily originates in the neighborhood of the contact points of adjoining teeth in the same jaw.

supplies contained 0.5 part per million or more. When comparisons are made on the basis of affected tooth surfaces, the rate in the cities with the lower fluoride water supplies was about 19 times as high as in the cities with the higher fluoride content; on the child-unit basis of comparison there was 11.5 times as much in the former cities as in the latter.

First permanent molar mortality.—The first permanent molar mortality [13] rate for each of these 13 cities was computed. As tooth mortality may to some extent be influenced by the amount of remedial treatment received (*4*), data with respect to the number and percent of filled first permanent molars are also included for a fuller interpretation of the molar mortality rates reported in table 7. These data are shown in table 7.

Incidence of endemic dental fluorosis (mottled enamel).—The incidence [14] and degree of mottled enamel observed in the groups of children studied are shown in table 8.

In accordance with a previously described method of computing a community mottled enamel index (*5*) on the basis of the percentage distribution of clinical severity, the approximate mottled enamel index of Galesburg and Colorado Springs is "slight"; that of East Moline and Kewanee, "border line"; and that of Pueblo, Marion, Lima, Middletown, Quincy, Zanesville, Portsmouth, Elkhart, and Michigan City, "negative."

PUBLIC WATER SUPPLIES [15]

Galesburg, Ill.—For a description of the Galesburg public water supply, see Public Health Reports, 54:862–888 (May 26, 1939). No changes in either source or treatment have occurred during the interim between the 1938 study and the present one.

[13] Knutson and Klein (Pub. Health Rep., 53: 1021–1032 (June 24, 1938) define tooth mortality as referring to "not only extracted permanent teeth but also those which are indicated for extraction and still present in the mouth." First permanent molar mortality rates reported in table 7 were computed in accordance with this definition.

[14] As in previous studies a child is classified as having endemic dental fluorosis (mottled enamel) when a positive diagnosis of even the mildest type of this affection is made for as few as two teeth. In communities where the fluoride content of the public water supply is in the neighborhood of the minimal threshold of mottled enamel (1.0 p. p. m. of F) the common practice in mottled enamel studies of reporting the incidence as a percentage of children affected (table 8) rather than the percentage of teeth affected, overstates rather than understates the extent of the affection. For instance, at Kewanee (Ill.) where a 12.2 percentage incidence of affection is reported in 123 children examined, a further analysis of the 3,196 permanent teeth, present and in position, of this group shows that approximately 95 percent are free of macroscopic evidence of dental fluorosis. Of the 163 teeth (5.1 percent) diagnosed as positive for dental fluorosis 155 (4.8 percent), were "very mild" and 8 (0.3 percent) were "mild." Distribution of the teeth diagnosed as positive with respect to specific teeth affected showed that 126, or 77 percent, were bicuspids or second molars. As noted in a previous report (*3*) somewhat similar findings were observed at Aurora (Ill.), and as stated in that report such sporadic instances of the mildest forms of dental fluorosis are of no practical esthetic significance.

[15] Information concerning these water supplies was furnished by a number of individuals; that for Colorado Springs and Pueblo by Dr. O. R. Gillett and Dr. W. E. Buck, city health officers, respectively, of these two cities; those for the Ohio cities by F. H. Waring and J. H. Bass of the Engineering Division of the Ohio Department of Health; description of the Elkhart and Michigan City supplies was furnished by B. A. Poole, Bureau of Sanitary Engineering, Indiana State Board of Health; and that relative to East Moline and Kewanee was obtained from C. W. Klassen, Division of Sanitary Engineering, Illinois Department of Public Health, from Bulletin No. 21, including Supplement No. 1 thereto, of the State Water Survey Division, and from local information.

TABLE 7.—*Summary of data respecting first molar mortality rates, and information on the number and percent of filled teeth, in selected white children, aged 12–14 years, of 13 cities*

[All teeth referred to in this table are first permanent molars]

	Galesburg, Ill	Colorado Springs, Colo	East Moline, Ill	Kewanee, Ill	Pueblo, Colo.	Marion, Ohio	Lima, Ohio	Middletown, Ohio	Quincy, Ill.	Zanesville, Ohio	Portsmouth, Ohio	Elkhart, Ind.	Michigan City Ind.
Number of children examined	273	404	152	123	614	263	454	370	330	459	469	278	236
Percent of children with 1 or more missing molars (including extraction indicated)	10.6	3.5	12.5	15.4	14.5	17.5	31.7	36.5	40.9	49.0	38.4	21.9	40.3
Estimated molar population (number of children examined × 4)	1,092	1,616	608	492	2,456	1,052	1,816	1,480	1,320	1,836	1,876	1,112	944
Number of molars showing dental caries experience													
(a) Filled teeth	170	185	84	57	321	162	457	422	533	502	629	523	444
(b) Teeth with untreated dental caries	234	437	194	172	1,057	515	814	555	360	614	676	399	274
(c+d) Extraction indicated and missing	41	[illegible]	24	36	124	66	254	244	235	458	346	95	189
(a+b+c+d) Total	445	641	302	265	1,502	743	1,525	1,221	1,128	1,574	1,651	1,017	907
Percent of molars showing dental caries experience	40.8	39.7	49.7	53.9	61.2	70.6	84.0	82.5	85.5	85.7	88.0	91.5	96.1
Percent of molars with dental caries experience that are filled $\left(\frac{a}{a+b+c+d}\right)$	38.2	28.9	27.8	21.5	21.4	21.8	30.0	34.6	47.3	31.9	38.1	51.4	49.0
First permanent molar mortality, number per 100 children	15.0	4.7	15.8	29.3	20.2	25.1	55.9	65.9	71.2	99.8	73.8	34.2	80.1

TABLE 8.—*Incidence and distribution of endemic dental fluorosis (mottled enamel) in children examined, classified according to the degree of affection*

Macroscopic signs of mottled enamel	Galesburg, Ill	Colorado Springs, Colo	East Moline, Ill.	Kewanee, Ill	Pueblo, Colo.	Marion, Ohio	Lima, Ohio	Middletown, Ohio	Quincy, Ill	Zanesville, Ohio	Portsmouth, Ohio	Elkhart, Ind.	Michigan City, Ind.
						NUMBER							
Children examined	273	404	152	123	614	263	454	370	330	459	469	278	236
Absent:													
Normal	69	26	56	65	444	151	382	312	307	392	417	254	230
Questionable	74	80	48	43	130	96	62	54	22	60	46	23	6
Present													
Very mild	110	170	45	13	38	14	10	4	1	7	6	1	0
Mild	17	86	3	2	2	2	0	0	0	0	0	0	0
Moderate	3	36	0	0	0	0	0	0	0	0	0	0	0
Severe	0	6	0	0	0	0	0	0	0	0	0	0	0
						PERCENT							
Total examined	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Absent													
Normal [a]	25.3	6.4	36.8	52.8	72.3	57.4	84.1	84.3	93.0	85.4	88.9	91.3	97.5
Questionable	27.1	19.8	31.6	35.0	21.2	36.5	13.7	14.6	6.7	13.1	9.8	8.3	2.5
Present:													
Very mild	40.3	42.1	29.6	10.6	6.2	5.3	2.2	1.1	.3	1.5	1.3	.4	0
Mild	6.2	21.3	2.0	1.6	.3	.8	0	0	0	0	0	0	0
Moderate	1.1	8.9	0	0	0	0	0	0	0	0	0	0	0
Severe	0	1.5	0	0	0	0	0	0	0	0	0	0	0
Incidence of affection	47.6	73.8	31.6	12.2	6.5	6.1	2.2	1.1	.3	1.5	1.3	.4	0

Colorado Springs, Colo.—The Colorado Springs public water supply has been obtained from surface sources for many years. In connection with a mottled enamel survey made in this city in 1935 (Pub. Health Rep., **50**:1719–1729 (Dec. 6, 1935)) the report noted that the source of the public water supply was melted snow from the south, west, and east slopes of Pike's Peak, and the east and west slopes of Mount Baldy. The water was stored in a system of seven mountain reservoirs located at altitudes ranging from 9,000 to 12,000 feet. From this chain of reservoirs the water was conveyed through a transmission system to settlers at Manitou, thence by gravity to three distribution reservoirs known as the High Line, Mesa No. 1, and Mesa No. 2. These distributing reservoirs were located on a mesa just west of the city and from these reservoirs began the city distribution system and the service mains. Water impounded in both the High Line and the Mesa Reservoirs was obtained from a common source and represented the type of water used by the inhabitants for many years.[16]

According to information furnished by Dr. O. R. Gillett, health officer of Colorado Springs, the following changes have occurred in the physical set-up and source of the water used by the inhabitants of Colorado Springs since 1935. Two dams on the north slope of Pike's Peak were completed, one in 1935, the other in 1937, with a total capacity of 1,133,273,400 gallons. A small settler on French Creek also on the north slope has been completed. Between 25 and 30 percent of the water used at present is obtained from these sources. The transmission line capacity to the city reservoirs has been enlarged and is now about twice the peak load demand. These changes subsequent to 1935 have apparently not influenced the fluoride (F) content of the public water supply. The mean annual fluoride (F) content of 12 monthly samples of the public water supply collected during 1933–34 was 2.5 parts per million. As will be shown later in this paper, 12 monthly samples collected during 1940–41 showed a fluoride (F) content of 2.6 parts per million. The supply is now chlorinated throughout the year.

East Moline, Ill.—The East Moline public water supply is obtained from three deep wells.

Well No. 1 was drilled in 1895 to a depth of 1,340 feet, and was repaired in 1913 and deepened to 1,532 feet. After the installation of well No. 3 in 1937, well No. 1 was held in reserve as a stand-by unit for emergencies; in 1940 well No. 1 was abandoned. Samples of well No. 1 collected in September 1936, and January 1937, showed a fluoride (F) content of 1 part per million.

Well No. 2 was drilled in 1911 to a depth of 1,371 feet. This well was redrilled in 1913 to a depth of 1,850 feet. A sample of water collected in January 1937, showed a fluoride (F) content of 1.6 parts per million.

Well No. 3, located about 50 feet from well No. 1, was drilled in 1937 to a depth of 1,600 feet. The casing is perforated through the St. Peter sandstone (1,000

[16] Years ago Colorado City (that part of the present Colorado Springs lying west of 20th Street, but annexed to Colorado Springs in 1917) was a separate community, comprising according to the 1900 and 1910 Censuses about 12 percent of the total population of the two communities. In its early days Colorado City used water from Sutherland and Bear Creeks in addition to water purchased by contract from Colorado Springs Dr Gillett states, however, that as nearly as he can ascertain from some of the old records, Colorado City was using water from a source similar to that of Colorado Springs as far back as 1878. There would seem some justification, therefore, for assuming that the inhabitants of Colorado Springs including the annexed portion, Colorado City, have been using a relatively similar type of water for approximately 60 years. There is, moreover, strong epidemiological evidence that the population of Colorado Springs has been ingesting water with appreciable amounts of fluoride for at least as long as 45 years. A survey made in 1909 (McKay, F S., in collaboration with Black, G V An Investigation of Mottled Teeth. Dental Cosmos, 58:477 (May), 627 (June), 781 (July), 894 (Aug) 1916) of 927 native born children of this city disclosed an 87.5 percent incidence of mottled enamel. As noted in table 9 of this report, an examination of 404 children in 1940 showed a 73.8 percent incidence of affection, observations that would indicate little difference in the fluoride content of the water used for a decade or more before the first survey and the concentration of fluoride in the water being used at present.

to 1,060 feet) and water is apparently being obtained from both the St. Peter and the Jordan sandstone (1,495 to 1,585 feet). A sample of water collected July 16, 1937 (Bulletin No. 21, Supplement No. 1, 1938, State Water Survey Division) showed a fluoride (F) content of 0.8 part per million. Water from wells Nos. 2 and 3 is discharged into a new concrete reservoir. Prior to its abandonment in 1940 water from well No. 1 was discharged into the "old" reservoir.

Well No. 4, drilled to a depth of 1,600 feet and drawing water from the Cambrian sandstone, was completed and put into service late in 1940.

The monthly samples collected during the 1935–1936 study (Pub. Health Rep. 52: 1249 (September 10, 1937)) would indicate that the water used by the population during this period (from wells Nos. 1 and 2) contained about 1.3 parts per million of fluorides (F). As a matter of record, it might also be noted that there is a cross connection between the public water supply and the 60-foot Fairbanks-Morse well.

Kewanee, Ill.—The Kewanee public water supply is obtained from two deep wells into the Cambrian sandstone. Wells into the St. Peter sandstone, which formerly furnished part of the city supply, were abandoned in 1925.

Well No. 1, drilled in 1919, is 2,497 feet in depth. The upper 500 feet of the well is cased with 16-inch pipe and below this casing joined to it by a swedge nipple is 506 feet of 14-inch pipe. Below the 14-inch pipe the well is 12 inches in diameter and is not cased. Well No. 2, drilled in 1927, is 2,438 feet in depth. This well is cased with 20-inch pipe from the surface to 439 feet and with 14-inch pipe from 439 feet to 1,488 feet. Below a depth of 1,488 feet the well is 12 inches in diameter and uncased. The casings do not exclude water from the St. Peter sandstone. A third well, 2,477 feet in depth, was completed in 1940, the mineral composition of the water from this well, however, has no bearing on this study because the clinical examinations were completed prior to its installation.

The Kewanee public water supply is reported to have cross connections with the private water supplies of the Kewanee Boiler Co. and the Walworth Manufacturing Co. for emergency purposes.

Pueblo, Colo.—The public water supply of Pueblo is obtained from surface sources, the Arkansas River. The city of Pueblo has two water systems, that part of the city north of the Arkansas River being supplied by what is known as the Pueblo Water Works, District No. 1 or the North Pueblo water supply, whereas that half of the city located south of the Arkansas River gets its water from another system known as the Pueblo Water Works, District No. 2 or the South Pueblo water supply. Both systems, however, obtain water from the Arkansas River which has been the source of the Pueblo public water supply for more than 50 years. A description of each supply follows:

> *North Pueblo water supply.*—Water is taken from the Arkansas River about 3 miles west of the city and diverted into reservoirs. In 1925 there were six reservoirs and in 1928 one more was added. Treatment consists of preliminary sedimentation, coagulation with aluminum sulfate, followed by sedimentation and disinfection with ammonia-chlorine. Reservoirs Nos. 1, 2, 3, and 4 are used for preliminary sedimentation and reservoirs Nos. 5, 6, and 7 for sedimentation after coagulation. The treatment does not include filtration. Prior to 1928 iron sulfate and lime were used as coagulants, and prior to November 1931 chlorine was used without ammonia.
>
> *South Pueblo water supply.*—Water is taken from the Arkansas River about 2 miles west of the city and diverted into reservoirs. In 1931 there were four reservoirs and in 1932 three more were added. Treatment consists of preliminary sedimentation, coagulation with aluminum sulfate followed by sedimentation and disinfection with ammonia chlorine.

Reservoirs Nos. 1, 2, and 3 are used for preliminary sedimentation and reservoirs Nos. 4, 5, 6, and 7 for sedimentation after coagulation. Under adverse conditions when the water is very turbid, lime and sulfate of iron are used. The treatment does not include filtration. Prior to November 1931, chlorine was used without ammonia.

Marion, Ohio.—The common water supply is obtained from 13 drilled wells located adjacent to the pump house and in the same well field. All of these wells penetrate a limestone deposit which extends within 20 feet of the surface of the ground and is adjacent to the Little Scioto River. The wells vary in diameter from 10 to 14 inches and in depth from 140 to 210 feet.

There have been no changes in the source of this supply during the lifetime of the group of children in this study, but marked changes in the chemical composition of the water probably occurred in 1928.

Until 1928 the supply was untreated but in that year the Marion Water Co. installed a lime-soda softening plant. The treatment is unique in that the holding capacities for the chemical treatment are nearly 24 hours and no filters are used. The plant is operated as follows: Water from the wells is aerated by flowing from a wooden trough over a weir to a splash board. The water then passes to two mixing chambers having a combined detention period of 1.2 hours at 5 m. g. d.[17] (the nominal capacity of the softening plant) and equipped with mechanical stirring devices. Lime, 16 to 20 grains per gallon, and soda ash, 16 to 19 grains per gallon, are applied as the water enters the mixing basin. Occasionally small quantities of alum are used. From the mixing chamber water flows to the clarifier which is equipped for the continuous removal of sludge and has a detention period of 9.4 hours at 5.0 m. g. d. Water is then recarbonated and passes to a settling tank having a detention period of 9.4 hours at 5 m. g. d. The water is then recarbonated a second time after which it is discharged to a clear well from which it is pumped to the distribution system. Marion was one of the cities where it was first noted [18] that the use of lime-soda softening resulted in a reduction of the fluoride concentration of the water.

In our study monthly samples were collected of both the raw water and the treated water. As will be shown later in this paper (table 9), the raw water contained a mean fluoride (F) content of 1.1 parts per million; the treated water, 0.4 part per million.

The hardness of the raw well water averages between 700 and 800 parts per million, that of the treated water in the neighborhood of 200 parts per million. For a year or two after the plant was put into service the water was softened down to less than 100 parts per million, but dropped back to the amount previously indicated (about 200 parts per million) on account of the large expense for the chemicals which, in the company's estimate, could not be justified by the present earning power.

Lima, Ohio.—The water supply of Lima is obtained from surface sources, the Ottawa River, a tributary of the Anglaize, a branch of the Maumee, and is from the Lake Erie watershed. Water is given long storage in the two shallow impounding reservoirs and then filtered through a rapid sand water purification plant.

The water is pumped from the Ottawa River into two storage reservoirs, Lima Lake (400,000,000 gallons capacity) constructed in 1904 and Lost Creek Reservoir (750,000,000 gallons capacity) installed in 1921. The water from these storage reservoirs flows through a 30-inch conduit to two receiving reservoirs located near the pumping station and filtration plant.

[17] M. g. d.=million gallons per day.

[18] See Scott, R. D., Kimberly, A. E., Van Horn, A L., Ey, L., and Waring, F. H.: Fluoride in Ohio water supplies. J. Am. W. W. Assoc., 29: 9–25 (January 1937).

The water purification was placed in operation in 1919. Water from the reservoir passes through an over and under baffle mixing chamber having a detention period of 6 minutes at the nominal capacity of the plant (8 m. g. d.). Alum, 1.5 to 3.0 grains per gallon, and sodium silicate, 0.20 to 0.85 grains per gallon, are used as a coagulant (sodium silicate treatment began March 1939). From the mixing chambers the water enters two coagulation basins having a combined detention period of 2 hours at 8 m. g. d. from whence the water passes through rapid sand filters. From the filters water flows to the clear well from where it is pumped to the distribution system. Post-chlorination with liquid chlorine is provided at all times and activated carbon is applied when necessary.

This surface water supply has been augmented by ground water [19] from wells during periods of extreme drought, as follows:

(*a*) In 1925 four of the "Tony's Nose" wells (a portion of the formerly abandoned supply) supplied 20 percent of the water consumed for a period of 6 months, or approximately 10 percent of the annual supply for that year.

(*b*) In the winter of 1930–31 the "Tony's Nose" wells supplied approximately 25 percent of the total supply for a 6-month period. The two new wells which were drilled near the Lima Lake Reservoir were also used during 1931. All existing supplies became inadequate in January of 1931 and it became necessary to obtain additional water from four private wells located within the city. It is estimated that during the winter of 1930–31 approximately 60 percent of the water supply was obtained from the various wells in use.

(*c*) In 1934 both the "Tony's Nose" wells and the "Lima Lake" wells were pumped from May to November. Approximately 12 percent of the annual supply was obtained from ground water sources during 1934.

(*d*) In 1936 the "Lima Lake" wells again supplied approximately 5 percent of the annual consumption in that year.

Middletown, Ohio.—The city of Middletown has obtained its water supply from drilled wells in the valley of Miami River for the past 25 years or more. Except for new wells added from time to time in the same general well field, no changes in the water supply have occurred. In 1924 the water supply of Middletown was obtained from twelve 6-inch and two 12-inch drilled wells. All of these wells are 35 feet deep and obtain water from a gravel and sand deposit which extends practically to the surface of the ground. In 1925 three wells having a diameter of 38 inches were installed in this same well field. Two of the large diameter wells are 165 feet deep and penetrate a gravel and sand deposit which underlies the deposit from which the small diameter wells obtain their supply. The third large diameter well is 40 feet deep and obtains water from the upper gravel stratum. From a chemical standpoint water from the two strata is practically identical. No changes have occurred in the water supply since 1925. Chlorination of the water supply was instituted in 1936 as a general factor of safety. The water receives no other treatment.

Quincy, Ill.—For a description of the Quincy public water supply, see PUBLIC

[19] Four wells at "Tony's Nose" are connected to the suction of a motor-driven centrifugal pump discharging into the line connecting Lima Lake with the receiving reservoirs. These wells were drilled some time between 1894 and 1900, were abandoned when Lost Creek Reservoir was constructed between 1918 and 1921, and have again been used at times of depleted water supply. Their estimated yield is approximately 1½ million gallons daily, but the water is undesirable on account of its gas and hardness.

In 1930, after the storage reservoirs had been nearly depleted because of deficient rainfall, two deep wells were drilled on the east side of Lima Lake, discharging into that reservoir. The estimated combined yield of these two wells is about 1 million gallons daily but because of the hydrogen sulfide content and the fact that this water materially increases the hardness of the general supply, the use of these wells is held to a minimum

HEALTH REPORTS, 54: 862–888 (May 26, 1939). No pertinent changes [20] in either source or treatment have occurred during the interim between the 1938 survey and the present study.

Zanesville, Ohio.—Since 1918 the Zanesville public water supply has been obtained from drilled wells located in a 40-acre area situated in the flood plains of and adjacent to the Muskingum River. The original installation consisted of 20 wells, but in 1925 wells Nos. 19 and 20 were abandoned and between that date and 1930 wells Nos. 1 to 18 supplied the city. In 1930, wells Nos. 1 to 11, inclusive, were replaced by 11 new wells located in the same well field. The city at the time of this study (January 1940) was supplied by new wells Nos. 1 to 11 and the original wells Nos. 12 to 18.

The wells, varying in diameter from 10 to 13 inches, are all approximately 85 feet deep, and are cased to their entire depth. Water enters the casing through perforations located in that portion of the casing which extends through the water-bearing stratum. Water is obtained from a gravel and sand deposit extending throughout the entire well field which varies in thickness from 20 to 50 feet. This deposit lies below a layer of impervious clay having a minimum depth of 10 feet and a maximum depth of approximately 40 feet. All the water is pumped from the well field to a receiving reservoir by air lift. The water receives no treatment.

Portsmouth, Ohio.—The Portsmouth public water supply is obtained from the Ohio River. The supply is treated in a water purification plant placed in service in 1914. Various improvements and additions have been installed since that date, none of the principal treatment units, however, having been materially changed. Water is pumped from an intake in the Ohio River through mixing basins which have a retention period of 0.25 hour at a flow of 8 m. g. d. Alum, from 0.75 to 2 grains per gallon, is used as a coagulant. It is also necessary to apply from 0.30 to 0.70 grain per gallon of lime to obtain proper coagulation with the alum. The water then passes through two coagulation basins operated in series. Basins Nos. 1 and 2 have a retention period of 6.5 and 3 hours, respectively, based on a flow of 8 m. g. d. From the coagulation basins the water passes through rapid sand filters and then to a clear well from whence it is pumped to the distribution system. Post-chlorination with liquid chlorine is applied at all times.

Elkhart, Ind.—The public water supply of Elkhart is obtained from various wells, the description of which follows:

1. Plant wells

Year of installation	*Diameter*	*Depth*
1897	39 ft.	31 ft. 4 in.
1899	38 ft. 6 in.	30 ft. 6 in.
1901	41 ft.	28 ft.

These three wells have been in constant service since their respective dates of installation.

2. Four gravel wall wells 24 inches in diameter and 70 feet deep were installed in 1927. Water from these four wells is pumped into a sand trap; thence the water flows by gravity directly into the reservoir.

3. The Bucklin well, installed in 1891, is 28 feet 4 inches in diameter and 31 feet 5 inches deep. Water from the Bucklin well, and also water from the three dug wells (Plant wells), is pumped directly into the distribution system.

4. Some water is also obtained during the peak-load season from a well installed in 1924 and made by drilling inside of a dug well to a depth of 45 feet, installing a

[20] The carbon dioxide used for removing excess lime is obtained from a natural gas instead of flue gas as stated in the earlier report. Also, while post-chlorination is provided for, it has not been necessary to use it since 1933.

16-inch casing, and filling the dug well with gravel. The amount of water, however, contributed by this well to the city supply during the year is negligible.

5. The two Bower Street wells were installed in the summer of 1936. They are gravel packed, 20 inches in diameter and 68 and 70 feet deep, respectively. These wells are used to supplement the other sources of supply during peak-load periods, May to September. During operation water from these wells is pumped directly into the distribution system. These wells are not used during the winter months. Since 1936 the Bower Street wells have furnished approximately 20 percent of the water used during the period of peak demand; this is about 5 percent of the total amount of water used throughout the entire year. During the time that the Bower Street wells are in use, the water is fairly well mixed and the monthly samples collected during the year would constitute a mixture of the several sources that constitute the water supply.

General.—To equalize daily fluctuation and hourly pressure a storage reservoir of 1.25 million gallon capacity and an elevated tank in the center of the distribution system of 500,000 gallon capacity were constructed in 1927. The reservoir is kept filled by the four deep wells installed in 1927. As will be seen in table 10, there was practically no change in the fluoride content of the water supply throughout the year.

Michigan City, Ind.—The public water supply of Michigan City is obtained from Lake Michigan. Prior to 1935 water direct from Lake Michigan was supplied to consumers, no treatment except chlorination being used. The complete filtration plant was placed in service late in 1935.

The water supply is obtained from Lake Michigan through two wooden crib intakes located about 3,000 feet from shore. Water is conveyed from the intakes to the suction wells through a 42- and a 24-inch cast-iron inlet pipe.

Raw water, to which ammonia and chlorine have been added, is pumped to a mixing chamber (detention 30 minutes) equipped with Dorr flocculators. Aluminum sulfate and activated carbon are applied to the suction side of the raw water pumps using dry feed equipment The water then flows to either of two 1 million gallons settling basins providing 3 hours' detention. The settled water is filtered through four rapid sand gravity filters, each having a capacity of 2 m. g. d. Filtered water flows by gravity to a 1.5 M. G. underground reinforced concrete reservoir. The water is given additional treatment with chlorine before being pumped to the distribution system and a 750,000-gallon elevated tank.

Chemical analyses of the common water supplies.—As was customary in previous studies, samples of the common water supply were collected, generally monthly, for approximately 1 year. The fluoride content of these waters was estimated colorimetrically by means of the zirconium-alizarin reagent (*6*). The results are given in table 9.

Analyses were made of constituents, other than the fluorides, using a sample from each of the water supplies of the cities studied. Results of these chemical analyses are given in table 10.

DISCUSSION

General findings.—In order that the results of this study might be presented as a coherent whole, the general findings of the study of the 8 suburban Chicago communities previously reported (*3*) will be included with the findings of the study of the 13 cities which form the basis of this report. A summary of the basic observations on the

TABLE 5.—Fluoride (F) content of the public water supplies of the cities studied

[All samples collected from a tap in the distribution system having average domestic use unless otherwise specified]

[Parts per million]

	Galesburg, Ill.	Colorado Springs, Colo	East Moline, Ill	Kewanee, Ill	Pueblo, Colo		Marion, Ohio		Lima, Ohio	Middletown, Ohio	Quincy, Ill	Zanesville, Ohio	Portsmouth, Ohio	Elkhart, Ind.	Michigan City, Ind
					North supply	South supply	Raw	Treated							
1939															
December	----	----	----	[1]0 9; [2]9	----	----	----	----	----	----	----	----	----	----	----
1940															
January	----	----	----	----	----	----	----	0 5	0 3	0 2	----	0 2	0 2	0 1	0 1
February	----	----	----	----	----	----	----	4	2	1	----	2	2	----	----
March	----	2 8	----	----	0 7	0 7	1 0	4	4	2	----	2	1	.1	.1
April	----	2 6	----	----	7	8	1 1	.4	3	3	0 1	1	1	.1	1
May	----	2 6	----	----	6	5	1 1	.6	2	2	1	2	2	.1	1
June	----	2 4	----	9	4	5	1 1	.4	3	.2	1	2	.1	.1	.0
July	----	2 5	----	----	5	6	1 2	4	4	3	1	2	.1	.1	.0
August	----	2 4	----	----	5	7	1 1	.4	3	2	.1	2	.1	1	.1
September	----	2 5	----	----	6	6	1 1	.4	4	2	1	2	.1	----	.1
October	----	2 5	1 3	----	5	5	1 1	.4	4	2	1	2	.1	.2	1
November	----	2 6	----	----	6	5	1 1	4	.3	.2	1	2	1	.1	.1
December	----	(3)	1 3	----	6	6	1 1	4	3	2	2	2	1	.1	.1
1941															
January	----	2 6	----	----	6	7					.1			.1	.1
February	1 9	2 6	----	----	6	6	----	----	----	----	2	----	----	1	.1
March	-		1 0	--	--	--	----	----	----	----	2	----	----	----	----
Mean	[4,5]1 9	[5]2 55	1 20	90	[5].58	61	1 10	43	32	21	[4]13	.19	.13	.11	.09

[1] Well No. 1.
[2] Well No. 2
[3] Container broken.
[4] Single samples of the Galesburg and Quincy public water supplies received in December 1938 disclosed a fluoride (F) content of 1.9 and 0 2 p. p m., respectively
[5] 12 monthly samples collected between November 1933 and October 1934 (Pub. Health Rep 50: 1719-1729 (Dec 6, 1935) showed a mean fluoride (F) content of 1.86, 2.53, and 0 57 p. p. m. for Galesburg, Colorado Springs, and Pueblo (north supply), respectively.

NOTE —The limit of the sensitivity of the procedure used for the fluoride determinations may be considered as about 0 1 part per million

TABLE 10.—*Mineral analyses of the common water supplies of the cities studied*

	Galesburg, Ill	Colorado Springs, Colo	East Moline, Ill	Kewanee, Ill	Pueblo, Colo		Marion, Ohio		Lima, Ohio	Middletown, Ohio	Quincy, Ill	Zanesville, Ohio	Portsmouth, Ohio	Elkhart, Ind.	Michigan City, Ind.
					North supply	South supply	Raw	Treated							
Residue on evaporation	1,094.4	46.4	1,055.2	1,908.0	524.8	514.4	1,052.8	754.4	372.0	345.0	132.0	485.2	154.4	248.8	196.8
Loss on ignition	40.0	7.2	48.8	86.0	56.0	74.4	106.4	32.0	106.0	45.0	14.0	92.0	35.2	36.8	49.6
Fixed residue	1,054.4	39.2	1,006.4	1,822.0	468.8	440.0	946.4	722.4	266.0	303.0	118.0	393.2	119.2	212.0	147.2
Silica (SiO_2)	7.2	8.0	7.5	38.0	14.4	16.0	28.0	19.6	2.0	8.0	10.0	13.0	8.0	12.0	17.6
Iron (Fe)	.1	.04	.04	.01	.06	.06	.08	.04	.01	.04	0	.05	.01	.01	.02
Aluminum (Al)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calcium (Ca)	57.2	8.0	64.6	115.7	76.0	78.1	206.8	52.0	60.0	85.0	22.9	87.9	25.2	54.9	36.6
Magnesium (Mg)	25.3	1.6	27.8	38.0	27.2	25.5	55.9	19.2	17.9	28.4	7.4	17.4	4.2	20.1	12.0
Sodium and potassium (calculated as Na)	296.7	2.6	282.0	506.2	41.1	38.8	17.7	145.7	12.1	5.0	3.7	33.2	8.8	4.5	1.7
Carbonate (CO_3)					9.6	8.4									
Bicarbonate (HCO_3)	295.2	23.2	309.9	300.1	154.9	164.7	341.6	42.7	148.8	317.2	37.8	153.7	28.0	245.2	136.6
Sulfate (SO_4)	351.7	4.9	240.3	308.6	213.1	203.8	163.2	450.9	89.7	45.4	45.3	89.3	57.6	16.0	21.4
Nitrate (NO_3)	3.1	1.0	3.9	6.6	5.5	4.8	1.0	1.0	5.5	5.3	4.4	.4	3.4	.4	0.6
Chloride (Cl)	190.5	.5	265.0	689.0	10.5	9.0	4.0	4.0	18.0	6.0	5.0	106.0	8.0	3.0	5.0
Phosphate (PO_4)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fluoride (F)	1.9	2.6	1.3	.9	.7	.7	1.1	.4	.3	.2	.1	.2	.1	.1	.1

The dates of receipt of these samples of water were as follows Galesburg Feb 1941, Colorado Springs May 1940, East Moline October 1940, Kewanee December 1939, Pueblo March 1940, Marion April 1940, Lima June 1940, Middletown January 1940, Quincy May 1940, Zanesville October 1939, Portsmouth April 1940, Elkhart November 1940, and Michigan City January 1940

Assistant Chemist C. G. Remsburg carried out the determinations other than fluoride, using mostly the methods given in the Standard Methods of Water Analysis of the American Public Health Association The phosphate was determined colorimetrically by an adaptation of the Benedict and Theis method (J. Biol Chem , 61: 63 (1924)).

TABLE 11.—*Summary of dental caries findings in 7,257 selected white school children, aged 12 to 14 years, in 21 cities of 4 States in relation to the fluoride (F) content of the public water supply*

	Galesburg, Ill.	Colorado Springs, Colo.	Elmhurst, Ill	Maywood, Ill.	Aurora, Ill	East Moline, Ill.	Joliet, Ill	Kewanee, Ill.	Pueblo, Colo	Elgin, Ill.	Marion, Ohio	Lima, Ohio	Evanston, Ill.	Middletown, Ohio	Quincy, Ill	Oak Park, Ill.	Zanesville, Ohio	Portsmouth, Ohio	Waukegan, Ill.	Elkhart, Ind	Michigan City, Ind
SELECTION OF STUDY GROUPS																					
Total number of 12- to 14-year-old children present at time of selection	918	1 444	633	873	1, 625	352	1, 412	522	1, 412	1, 030	1, 010	1, 411	2, 125	1, 013	1, 063	1, 662	1, 248	1, 228	1, 354	942	654
Number of 12- to 14-year-old white children whose histories on repeated questioning indicated continuity of exposure and who were examined	273	404	170	171	633	152	447	123	614	403	263	454	256	370	330	329	459	469	423	278	236
Percentage of the total present who were examined	29 7	28 0	26 9	19 6	39 0	43 2	31 7	23 6	43 5	39 1	26 0	32 2	12 0	36 5	31 0	19 8	36 8	38 2	31.2	29 5	36 1
WATER SUPPLY																					
Source [1]	G	S	G	G	G	G	G	G	S	G	G	S	S	G	S	S	G	S	S	G	S
Total hardness in parts per million	247	27	323	75	329	276	349	445	302	103	209	223	131	329	88	132	291	80	134	220	141
Mean fluoride (F) content in parts per million of cities studied	1 9	2 6	1 8	[4]1 2	1.2	1 2	1.3	0 9	0 6	0 5	[4]0 4	0 3	0	0 2	0.1	0	0 2	0.1	0	0.1	0.1
[4]		>1 4			1 4 to 1 0			0 9 to 0 5								<0 5					
CLINICAL EXAMINATION																					
Unit basis of measurement Teeth.																					
Dental caries experience, permanent teeth, per 100 children examined	236	246	252	258	281	303	323	343	412	444	556	652	673	703	706	722	733	772	810	823	1, 037
		244			294				416							740					

First permanent molar mortality, per 100 children examined	15.0	4.7	11.8	11.7	14.5	15.8	19.5	29.3	20.2	20.3	25.1	55.9	42.6	65.9	71.2	31.0	99.8	73.8	79.9	34.2	80.1
Tooth surface																					
Dental caries experience, proximal surfaces, superior permanent incisors, per 100 surfaces	0.46	0.31	0.60	0.59	0.78	0.16	1.3	1.4	0.47	4.1	3.3	3.2	10.7	7.[illegible]	11.2	9.0	11.4	10.4	17.7	11.2	18.1
Child:																					
Percent of children with 1 or more permanent teeth showing dental caries experience	72.2	71.5	74.7	70.2	76.5	79.6	81.7	82.1	89.4	88.6	94.3	97.8	96.1	98.1	97.6	95.7	97.4	98.7	96.9	98.6	100.0
Percentage incidence of endemic dental fluorosis (mottled enamel)	47.6	73.8	40.0	33.3	15.0	31.6	25.3	12.2	6.5	4.2	6.1	2.2	1.6	1.1	0.3	0.6	1.5	1.3	[illegible].2	0.4	.

[1] S=surface water, G=ground water

[2] There is both presumptive and direct evidence that prior to a few years ago the Maywood water contained probably 1.4 to 1.6 p. p. m. of F (Pub. Health Rep. 56: 761–792 (Apr. 11, 1941)).

[3] There is both presumptive and direct evidence that prior to a few years ago the East Moline water contained as much as 1.5 p.p.m. of F (Pub. Health Rep. 52: 1249–1264 (Sept. 10, 1937)).

[4] Prior to 1928 this water supply probably contained about 1.1 p. p. m. of F. See reference in text concerning treatment of raw water; see table 9 for its analysis.

[5] Range of fluoride (F) concentration of water supply and dental caries experience rate of children in these specified groupings.

permanent teeth of 7,257 selected white urban school children, aged 12 to 14 years, of these 21 cities is shown in table 11 and figure 1.

Probably the outstanding epidemiological characteristic of these data is the striking variation in the intensity of dental caries attack as evidenced by the marked differences in the amount of dental caries experience. Considering the relative homogeneity of these populations, the method of selecting the study groups, and the similarity of diagnostic standards used, it does not seem likely that such differences can be due to other than the mineral composition of the public water supply. Study of the cause or causes of these differences may shed

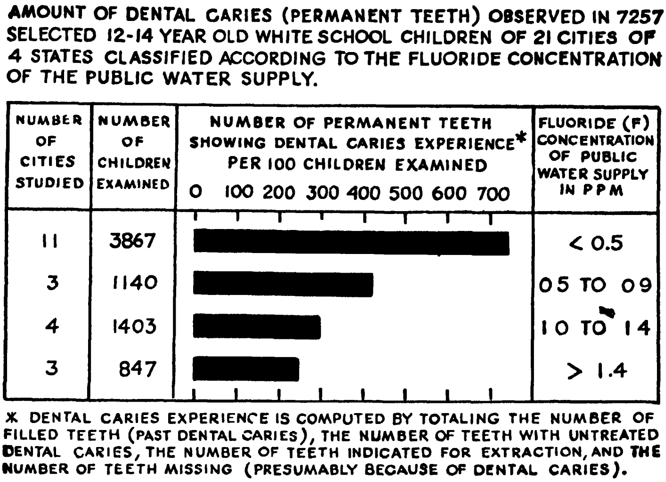

FIGURE 1

important light upon either the etiology or the means of partially controlling dental caries.

That the inhibitory agent is the fluoride content of the water supply seems highly probable. An inspection of the range of dental caries experience associated with the use of domestic water of different fluoride concentration discloses an inverse relation in general between the amount of dental caries and the fluoride concentration of the common water supply. Relatively low dental caries experience rates are found associated with the use of domestic waters whose fluoride (F) concentrations have a range of 1 or more parts per million. Intermediately, e. g., at concentrations of 0.9 to 0.5 part per million, the influence is less marked than at the higher concentrations; nevertheless, the dental caries experience rates are distinctly lower than those associated with the use of relatively fluoride-free waters. A further inspection of the data reported in table 11 and figure 2 for those cities whose public water supplies contain less than 0.5 part per million discloses a considerable variation among those cities characterized by

high dental caries experience. This variation is marked, particularly between those communities whose public water supplies did not show fluoride (F) in excess of 0.2 part per million. As has been pointed out, however, the limit of sensitivity of the method of determination may be considered as about 0.1 part per million and hence further discussion at present of this variation would not seem justified.[21]

A correlation between the dental caries experience rates and the

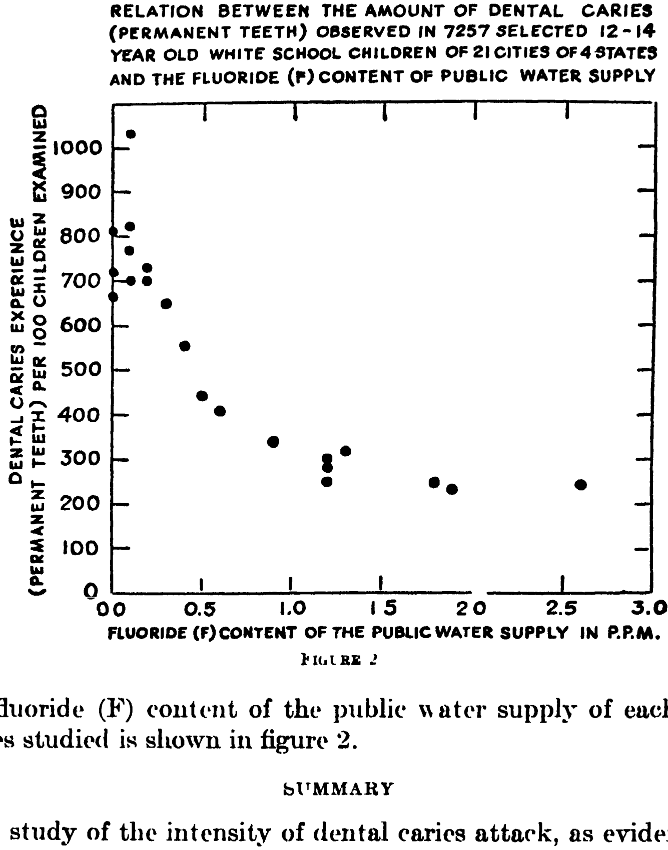

FIGURE 2

mean fluoride (F) content of the public water supply of each of the 21 cities studied is shown in figure 2.

SUMMARY

1. A study of the intensity of dental caries attack, as evidenced by the observed dental caries experience, disclosed striking differences among children of different cities. This study embraced 7,257 [22] white urban school children, aged 12 to 14 years, of 21 cities; in the main the children were apparently of largely comparable circumstances and the groups examined were relatively equitable respecting sex ratio. The groups studied were limited to those children *continuously exposed throughout life to the variable under investigation* (the com-

[21] For this reason no attempt was made at this time to fit a curve to the data shown in figure 2.

[22] These totals, 7,257 children of 21 cities, represent the 4,425 children of 13 cities reported in detail in this paper and the 2,832 children of 8 suburban Chicago communities previously reported (*3*). See table 11 and figures 1 and 2 of this report

mon water supply). Clinical examinations in all 21 cities were made by the same two dental officers and in each city an equal number of children were examined by each examiner. It seems unlikely that such marked differences in the prevalence of dental caries can be explained on the basis of the hardness of the domestic water, the hours of sunshine, or gross dissimilarities in diet (water excluded).

2. A general inverse correlation between the fluoride concentrations of the public water supplies in the 21 cities studied and the amount of dental caries was observed. Differences in dental caries experience rates of as much as 2 and 3 times the observed minimal were not unusual; the highest rate, 1,037, at Michigan City (Ind.) was 4.4 times that observed in the city with the lowest rate, 236, at Galesburg (Ill.). Strikingly low dental caries prevalence was found associated with the continuous use of domestic waters whose fluoride (F) content was as low as about 1 part per million, a concentration which under the conditions prevailing in the localities studied produced only sporadic instances of the mildest forms of dental fluorosis of no practical esthetic significance.

3. As in previous studies, marked differences were observed with respect to: (*a*) The amount of dental caries experience in the proximal surfaces of the four superior permanent incisors, and (*b*) the first permanent molar mortality rates. Of the 4,425 children of the 13 cities whose caries experience is reported in detail in this report, the 2,859 children living in communities whose public water supply contained less than 0.5 p. p. m. of fluoride (F) showed about 19 times as much proximal surface caries experience in the four superior permanent incisors as was observed in the 1,566 children living in cities where the common water supplies contained from 0.6 to 2.6 p. p. m. of fluoride (F). In these same two groups of children, the first permanent molar mortality rate for those living where the water supply contained less than 0.5 p. p. m. of fluoride (F) was about 4 times as high as that observed in the children using a domestic water containing more than 0.5 p. p. m. of fluoride (F) (66.0 and 15.6 per 100 children examined, respectively). Inasmuch as the group with the higher first permanent molar mortality rate showed 38 percent of its total first permanent molar caries experience with fillings as opposed to only 26 percent in the group characterized by the lower mortality rate, there would seem justification in assuming that such differences in first permanent molar mortality rates are influenced to a considerable degree by a variation in either the intensity of dental caries attack, and/or the resistance of the teeth to caries attack.

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and the local health units concerned. To the superintendents of education and the other educational authorities of these cities special thanks are due for their wholehearted cooperation in all phases of this study.

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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

June 21–July 18, 1942

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended July 18, 1942, the number reported for the corresponding period in 1941, and the median number for the years 1937–41.

DISEASES ABOVE MEDIAN PREVALENCE

Influenza.—The number of cases (1,690) of influenza reported for the four weeks ended July 18 was less than one-half of the number reported for the corresponding period in 1941, but it was about 16 percent above the 1937–41 median figure for this period. The increase over the seasonal expectancy seemed to be due largely to an excess of cases in the West South Central, Mountain, and Pacific regions.

Meningococcus meningitis.—There were 288 cases of meningococcus meningitis reported for the current period, as compared with 151, 89, and 134 for the corresponding period in 1941, 1940, and 1939. Each region of the country except the East North Central reported an excess of cases over the average for preceding years; the increases ranging from 1.3 times the average in the West South Central region to more than 8 times the average figure in the New England region. A gradual decline in the number of cases of this disease until about October is normally expected, but the current incidence represented an increase over the preceding 4-week period of approximately 25 percent.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—There were 558 cases of diphtheria reported during the four weeks ended July 18, as compared with 637 in 1941 and an average of 986 cases for the corresponding period in the years 1937–41. A few more cases than might normally be expected were reported from the New England region, but in all other sections of the country the incidence was relatively low.

Measles.—The number of cases of measles reported (23,046) was only about one-half of the number reported during this period in 1941, but it was only slightly below the 1937 41 median figure (approximately 24,000 cases). The incidence was unusually high in the Mountain and Pacific regions, with a slight increase over the normal seasonal level in the West North Central region; all other regions reported very significant declines from the normal seasonal expectancy.

Poliomyelitis.—The number of cases of poliomyelitis rose from 97 during the preceding 4-week period to 237 for the current period. The number of cases for the country as a whole was less than 60 percent of the incidence for the corresponding period in 1941 and slightly more than 60 percent of the preceding 5-year average incidence. The highest incidence was reported from the West South Central regions; States in those regions reporting the largest numbers of cases were Arkansas (38); Kentucky (25); Tennessee (18); Louisiana (11); and Alabama (10). An increase in the number of cases of this disease normally occurs at this season of the year but the increases in those regions were considerably above the normal expectancy.

Scarlet fever.—The incidence of scarlet fever was also relatively low, the number of cases reported (3,866) for the current period being about 75 percent of the number reported in 1941 and about 68 percent of the seasonal expectancy (5,703 cases). The situation was favorable in all sections of the country except the East South Central.

Smallpox.—The number of cases (51) of smallpox was the lowest on

record for this period. The incidence in the East South Central region stood at about the normal seasonal level, but very significant decreases were reported from other regions.

Typhoid and paratyphoid fever.—For the current period there were 789 cases of typhoid fever reported, which was the lowest number on record for this period. Each section of the country except New England reported a decline from the 1937–41 median figure for the corresponding weeks.

Whooping cough.—For the country as a whole the incidence of this disease was relatively low, 13,923 cases being reported as compared with 16,536 in the preceding year and an average of 15,870 for the years 1938–41. The disease was, however, unusually prevalent in the North Atlantic and East North Central regions, while all other regions reported very definite declines from the normal seasonal incidence.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the four weeks ended July 18, based on data received from the Bureau of the Census, was 10.7 per 1,000 inhabitants (annual basis). The rate for the corresponding period in 1941 was 11.0 and the average rate for the years 1939–41 was 10.9.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period June 21–July 18, 1942, the number for the corresponding period in 1941, and the median number of cases reported for the corresponding period, 1937–41

Division	Current period	1941	5-year median	Current period	1941	5-year median	Current period	1941	5-year median
	Diphtheria [1]			Influenza [1]			Measles [2]		
United States	558	637	986	1,690	3,471	1,452	23,046	44,796	23,946
New England	24	15	17	1	4	8	3,160	4,468	3,929
Middle Atlantic	75	93	137	22	13	19	4,581	14,330	8,422
East North Central	99	117	176	135	101	124	4,007	11,255	7,655
West North Central	34	57	63	26	42	47	1,263	1,603	1,168
South Atlantic	88	119	160	537	622	546	1,193	7,845	1,741
East South Central	56	46	63	70	82	82	186	1,218	720
West South Central	102	89	141	493	1,118	309	644	1,795	1,035
Mountain	31	47	66	297	199	99	1,898	978	978
Pacific	49	54	94	109	1,290	95	6,114	1,304	1,304
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	288	151	150	237	415	390	3,866	5,053	5,703
New England	41	11	5	8	2	5	507	519	519
Middle Atlantic	74	35	34	13	24	18	984	1,506	1,705
East North Central	11	12	20	35	33	33	1,106	1,612	1,962
West North Central	16	6	12	17	17	17	321	345	381
South Atlantic	51	47	35	22	167	58	279	275	275
East South Central	21	14	14	60	111	41	162	211	153
West South Central	21	10	10	56	24	31	108	118	129
Mountain	7	4	3	13	6	9	109	132	181
Pacific	46	12	8	13	31	44	290	335	389
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	51	84	381	789	843	1,369	13,933	16,586	[3] 15,870
New England	0	0	0	24	21	21	1,483	941	965
Middle Atlantic	0	0	0	74	74	89	3,628	2,640	3,303
East North Central	15	28	98	67	109	109	3,757	3,182	3,650
West North Central	11	26	127	40	36	57	665	1,418	904
South Atlantic	1	1	3	196	163	415	1,391	2,503	2,400
East South Central	12	6	11	133	123	238	528	581	600
West South Central	6	4	21	204	256	348	965	1,568	1,465
Mountain	5	8	34	33	32	48	525	1,352	853
Pacific	1	11	60	18	29	52	991	2,383	1,418

[1] Mississippi, New York, and Pennsylvania excluded, New York City included.
[2] Mississippi excluded
[3] 4-year (1938–41) average.

DEATHS DURING WEEK ENDED JULY 25, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 25, 1942	Corresponding week, 1941
Data from 86 large cities of the United States.		
Total deaths	8,392	7,563
Average for 3 prior years	7,849	
Total deaths, first 29 weeks of year	247,523	250,546
Deaths per 1,000 population, first 29 weeks of year, annual rate	12 0	12.1
Deaths under 1 year of age	611	556
Average for 3 prior years	504	
Deaths under 1 year of age, first 29 weeks of year	16,154	15,056
Data from industrial insurance companies		
Policies in force	64,940,046	64,389,697
Number of death claims	10,766	9,975
Death claims per 1,000 policies in force, annual rate	8 6	8.1
Death claims per 1,000 policies, first 29 weeks of year, annual rate	9 6	10.0

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED AUGUST 1, 1942

Summary

The seasonal increase in poliomyelitis continued during the current week, but the rise was less sharp than in the two preceding weeks. A total of 145 cases was reported for the country as a whole, as compared with 124 and 83 for the two preceding weeks, respectively. The incidence still remains below the 5-year (1937–41) median expectancy and lower than any other year since 1938. The largest numbers of cases were reported from the South Central, Middle Atlantic, and East North Central areas. The following-named States are the only ones which reported 10 or more cases for the current week (last week's figures in parentheses): Kentucky 16 (20), Tennessee 15 (11), Illinois 12 (12), Arkansas 10 (15), and New Jersey 10 (4). Most of the cases in Arkansas are stated to be mild or abortive type which rarely reach the paralysis stage. Two deaths have occurred among the 80 cases reported in Arkansas to date this year.

Of a total of 54 cases of meningococcus meningitis (45 last week), 24 occurred in the New England and Middle Atlantic States, 8 in the South Atlantic, and 9 in the Pacific States (6 in California). The incidence of the other 7 important communicable diseases included in the following weekly table, for which comparable weekly figures for prior years are available, continues low.

Other diseases reported during the current week include 2 cases of anthrax (1 each in Pennsylvania and Ohio), 44 cases of amebic dysentery (31 in Texas), 289 cases of bacillary dysentery (159 in Texas, 32 in Illinois), 369 cases of unspecified dysentery (321 in Virginia), 8 cases of infectious encephalitis, 27 cases of Rocky Mountain spotted fever, of which only 4 occurred in the northwest Mountain States, 6 cases of smallpox, 17 cases of tularemia, and 120 cases of endemic typhus fever (58 in Texas and 37 in Georgia).

The death rate (annual basis) for the current week in 88 large cities in the United States is 10.4 per 1,000 population, as compared with 11.8 for the preceding week and with a 3-year (1939–41) average of 11.4 for the corresponding week.

For the first 5 months of 1942, the death rate for 40 States and the District of Columbia was 10.9 per 1,000 population, as compared with 11.4 for the same period last year, the birth rate 19.3 as compared with 17.8 for the same period last year, and the infant mortality rate 45.1 as compared with 51.2 last year.

Telegraphic morbidity reports from State health officers for the week ended August 1, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median, 1937–41	Week ended—		Median, 1937–41	Week ended—		Median, 1937–41	Week ended—		Median, 1937–41
	Aug. 1, 1942	Aug. 2, 1941		Aug. 1, 1942	Aug. 2, 1941		Aug. 1, 1942	Aug. 2, 1941		Aug. 1, 1942	Aug. 2, 1941	
NEW ENG.												
Maine	0	0	0	------	------	------	20	53	23	3	0	0
New Hampshire	0	0	0	------	1	------	18	3	3	0	0	0
Vermont	0	0	0	------	------	------	47	48	12	0	0	0
Massachusetts	4	2	2	------	------	------	164	125	106	2	3	0
Rhode Island	1	1	0	------	------	------	42	10	10	0	0	0
Connecticut	1	1	2	1	------	1	51	51	18	3	0	0
MID. ATL.												
New York	11	15	15	[1] 4	[1] 1	[1] 3	211	202	314	10	6	4
New Jersey	3	0	4	2	2	2	53	117	117	4	0	0
Pennsylvania	7	6	9	------	------	------	74	264	151	2	3	3
E. NO. CEN.												
Ohio	1	3	4	8	3	5	43	123	106	1	0	0
Indiana	4	4	5	------	4	2	4	32	10	1	0	0
Illinois	8	16	16	5	------	6	33	50	50	2	2	2
Michigan [2]	1	0	7	------	------	------	31	122	128	1	1	1
Wisconsin	7	1	0	8	5	9	196	188	188	0	0	0
W. NO. CEN.												
Minnesota	2	1	0	1	------	1	24	5	18	0	2	1
Iowa	0	1	1	------	------	------	18	25	25	0	1	1
Missouri	0	5	2	------	2	2	5	23	8	0	2	1
North Dakota	0	1	1	1	2	------	4	14	1	0	0	0
South Dakota	1	4	4	------	------	------	2	0	1	0	0	0
Nebraska	1	0	0	2	------	------	31	2	5	0	0	0
Kansas	1	2	3	------	1	1	10	21	15	1	1	1
SO. ATL.												
Delaware	0	0	0	------	------	------	0	2	1	0	0	0
Maryland [2]	0	0	2	2	------	1	27	101	11	3	2	0
Dist. of Col.	0	0	3	------	------	------	2	11	6	0	0	0
Virginia	3	5	5	45	61	15	9	102	57	2	2	1
West Virginia	6	1	3	------	2	3	2	48	19	2	0	1
North Carolina	4	7	12	------	------	------	13	63	62	1	0	0
South Carolina	4	1	3	63	61	66	12	63	9	0	0	1
Georgia	11	9	9	2	10	3	6	44	7	0	0	0
Florida	3	2	4	3	23	------	11	25	9	0	0	0
E. SO. CEN.												
Kentucky	5	1	5	------	------	1	10	21	21	2	1	2
Tennessee	2	2	3	11	9	7	5	33	16	0	2	1
Alabama	3	8	12	23	2	5	2	12	18	0	1	1
Mississippi [2]	3	4	9	------	------	------	------	------	------	0	0	0
W. SO. CEN.												
Arkansas	5	2	3	15	2	7	17	32	4	0	0	0
Louisiana	3	0	6	3	1	6	4	2	2	1	0	0
Oklahoma	2	1	3	4	7	7	2	16	13	0	0	0
Texas	27	25	22	83	348	55	36	106	66	2	0	1
MOUNTAIN												
Montana	0	0	0	2	5	------	18	0	16	0	0	0
Idaho	0	0	1	------	------	------	12	0	4	0	0	0
Wyoming	1	5	1	11	3	------	14	2	3	0	0	0
Colorado	2	8	7	20	22	------	16	31	21	0	0	0
New Mexico	2	0	2	------	2	------	9	26	14	1	0	0
Arizona	0	1	1	17	22	15	25	29	13	0	0	0
Utah [2]	0	0	0	------	------	------	101	8	19	0	0	0
Nevada	0	0	------	------	------	------	4	0	------	1	0	------
PACIFIC												
Washington	1	1	1	------	4	------	84	5	16	3	0	0
Oregon	0	0	0	9	4	8	49	7	13	0	0	0
California	10	15	16	24	38	10	292	111	111	6	0	0
Total	150	161	248	369	643	330	1,863	2,378	2,246	54	29	29
30 weeks	6,915	6,979	11,127	79,691	488,032	158,708	463,284	819,652	345,945	2,242	1,328	1,328

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 1, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Aug. 1, 1942	Aug. 2, 1941		Aug. 1, 1942	Aug. 2, 1941		Aug. 1, 1942	Aug. 2, 1941		Aug. 1, 1942	Aug. 2, 1941	
NEW ENG.												
Maine	8	4	1	9	0	2	0	0	0	1	2	2
New Hampshire	0	0	0	0	1	1	0	0	0	0	1	1
Vermont	0	0	0	1	2	2	0	0	0	1	0	0
Massachusetts	0	5	3	48	64	32	0	0	0	1	4	3
Rhode Island	0	1	0	1	2	2	0	0	0	0	0	0
Connecticut	1	6	1	10	4	9	0	0	0	0	2	4
MID. ATL.												
New York	7	12	11	66	80	73	0	0	0	10	16	12
New Jersey	10	5	3	15	37	23	0	0	0	5	4	5
Pennsylvania	5	15	4	55	40	48	0	0	0	6	13	14
E. NO. CEN.												
Ohio	5	16	13	51	49	72	0	0	1	16	17	14
Indiana	2	5	5	6	9	15	0	1	6	0	4	4
Illinois	12	13	7	41	46	64	1	0	4	13	21	20
Michigan [3]	4	8	8	35	44	69	0	2	1	5	4	4
Wisconsin	1	3	0	31	37	37	2	0	1	0	1	1
W. NO. CEN.												
Minnesota	1	3	2	18	10	19	0	0	4	0	0	0
Iowa	2	1	1	11	9	18	0	1	4	6	1	5
Missouri	2	1	3	3	24	13	0	0	1	4	8	11
North Dakota	0	0	0	3	1	6	2	0	1	0	0	0
South Dakota	0	5	2	6	3	4	0	1	1	0	0	0
Nebraska	2	0	1	1	1	3	0	0	0	0	0	0
Kansas	0	0	3	23	6	17	0	0	0	3	6	6
SO. ATL.												
Delaware	0	0	0	2	1	1	0	0	0	0	0	0
Maryland [3]	0	14	0	9	23	10	0	0	0	6	8	6
Dist. of Col.	0	0	0	6	2	3	0	0	0	0	0	1
Virginia	3	4	4	10	5	11	0	0	0	10	4	23
West Virginia	3	1	1	10	7	13	0	0	0	5	5	10
North Carolina	3	0	2	14	10	15	0	0	0	7	16	19
South Carolina	2	5	2	3	0	2	0	0	0	1	3	16
Georgia	4	71	3	14	10	9	0	0	0	18	13	35
Florida	1	27	1	3	2	2	0	0	0	4	4	3
E. SO. CEN.												
Kentucky	16	7	6	16	16	11	0	0	0	23	14	37
Tennessee	15	13	2	11	16	13	1	0	0	11	13	17
Alabama	6	49	2	13	14	13	0	0	0	5	7	11
Mississippi [3]	4	9	1	6	5	5	0	0	0	12	16	15
W. SO. CEN.												
Arkansas	10	1	1	5	1	4	0	1	1	11	20	31
Louisiana	3	5	5	3	3	5	0	0	0	13	9	23
Oklahoma	3	0	3	5	4	7	0	0	2	9	1	26
Texas	5	4	7	14	7	8	0	0	0	29	28	67
MOUNTAIN												
Montana	0	0	0	2	3	5	0	0	0	0	1	1
Idaho	0	0	0	1	0	2	0	0	0	2	0	1
Wyoming	0	0	0	2	0	1	0	0	0	0	1	0
Colorado	1	2	1	12	8	8	0	0	1	0	1	3
New Mexico	2	0	0	3	0	3	0	0	0	3	6	5
Arizona	0	0	0	1	1	3	0	0	0	3	1	1
Utah [2]	0	1	1	1	3	4	0	0	0	0	2	2
Nevada	0	0	------	0	0	--------	0	0	------	1	0	------
PACIFIC												
Washington	0	1	0	4	8	13	0	0	2	0	4	4
Oregon	0	1	1	1	7	6	0	0	1	1	3	3
California	2	8	20	34	40	52	0	0	9	1	7	14
Total	145	326	197	639	665	793	6	6	76	246	291	534
30 weeks	1,020	1,815	1,360	87,281	88,046	114,282	602	1,133	7,795	3,391	3,764	5,599

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 1, 1942, and comparison with corresponding week of 1941—Continued

Division and State	Whooping cough		Week ended Aug. 1, 1942								
	Week ended—		Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt spotted fever	Tularemia	Typhus fever
	Aug. 1, 1942	Aug. 2, 1941		Amebic	Bacillary	Unspecified					
NEW ENG.											
Maine	54	19	0	0	0	0	0	0	0	0	0
New Hampshire	0	16	0	0	0	0	0	0	0	0	0
Vermont	64	11	0	0	0	0	0	0	0	0	0
Massachusetts	217	195	0	0	0	0	0	0	0	0	0
Rhode Island	6	22	0	0	0	0	0	0	0	0	0
Connecticut	95	49	0	1	0	0	0	0	0	0	0
MID. ATL.											
New York	442	235	0	1	14	0	0	0	2	0	2
New Jersey	257	99	0	0	0	0	0	0	0	0	0
Pennsylvania	293	229	1	0	1	0	1	0	2	0	0
E. NO. CEN.											
Ohio	227	343	1	0	0	1	0	0	0	0	0
Indiana	56	13	0	0	0	6	0	0	0	0	0
Illinois	408	164	0	0	32	0	2	0	1	0	0
Michigan [2]	262	317	0	0	5	0	0	0	0	0	0
Wisconsin	291	225	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	53	53	0	3	1	0	0	0	0	0	0
Iowa	33	53	0	0	0	0	0	0	0	0	0
Missouri	16	72	0	0	0	0	0	0	0	2	0
North Dakota	5	30	0	0	0	0	2	0	0	0	0
South Dakota	1	7	0	0	0	0	1	0	0	0	0
Nebraska	6	7	0	0	0	0	0	0	0	0	0
Kansas	66	79	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	2	2	0	0	0	0	0	0	0	0	0
Maryland [2]	46	84	0	0	0	5	0	0	7	0	0
Dist. of Col.	12	20	0	0	0	0	0	0	0	0	0
Virginia	68	50	0	0	0	321	0	0	5	2	0
West Virginia	16	21	0	0	0	8	0	0	1	0	0
North Carolina	77	244	0	0	0	0	0	0	3	1	5
South Carolina	18	104	0	0	0	0	0	0	0	0	6
Georgia	25	34	0	0	7	0	0	0	0	1	37
Florida	22	36	0	0	5	0	0	0	0	0	8
E. SO. CEN.											
Kentucky	76	61	0	0	5	0	0	0	1	0	0
Tennessee	40	44	0	2	0	18	0	0	0	2	0
Alabama	17	22	0	0	0	0	0	0	1	0	1
Mississippi [2]	------	---	0	0	0	0	0	0	0	1	0
W. SO. CEN.											
Arkansas	16	7	1	1	19	0	0	0	0	4	0
Louisiana	6	17	0	0	24	0	0	0	0	0	3
Oklahoma	2	39	0	0	0	0	0	0	0	0	0
Texas	99	178	0	31	159	0	1	0	1	0	58
MOUNTAIN											
Montana	24	29	0	0	0	0	0	0	0	0	0
Idaho	6	11	0	0	0	0	0	0	2	0	0
Wyoming	8	6	0	0	0	0	0	0	2	0	0
Colorado	29	123	0	0	0	0	1	0	0	0	0
New Mexico	9	17	0	0	5	0	0	0	0	0	0
Arizona	10	16	0	0	0	18	0	0	0	0	0
Utah [2]	37	29	0	0	0	0	0	0	0	3	0
Nevada	0	0	0	0	0	0	0	0	0	1	0
PACIFIC											
Washington	22	110	0	0	0	0	0	0	0	0	0
Oregon	10	29	0	0	0	0	0	0	0	0	0
California	144	335	0	5	12	0	0	0	0	0	0
Total	3,693	3,906	3	44	289	377	8	0	28	17	120
30 weeks	112,867	136,223	------	------	------	------	------	------	------	------	------

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 18, 1942

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	2	0	0	0	1	0	0	0	2	1
Baltimore, Md	1	0	1	1	16	1	11	0	5	0	0	25
Barre, Vt	0	0	---	0	0	0	0	0	0	0	0	8
Billings, Mont	0	0	---	0	8	0	1	0	0	0	0	4
Birmingham, Ala	0	0	1	0	0	1	1	0	1	0	0	3
Boise, Idaho	0	0	---	0	0	0	0	0	0	0	0	3
Boston, Mass	2	0	---	0	53	0	8	0	31	0	0	40
Bridgeport, Conn	0	0	---	0	0	1	0	0	0	0	0	2
Brunswick, Ga	0	0	---	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	---	1	6	1	11	0	2	0	1	6
Camden, N. J	0	0	---	0	1	0	2	0	1	0	0	5
Charleston, S. C	0	0	---	0	0	0	4	0	1	0	0	0
Charleston, W. Va	0	0	---	0	0	0	0	0	0	0	0	2
Chicago, Ill	5	1	1	0	11	0	15	2	24	0	0	174
Cincinnati, Ohio	0	0	3	0	0	0	2	0	8	0	1	7
Cleveland, Ohio	0	0	9	0	5	0	4	0	14	0	1	42
Columbus, Ohio	1	0	1	1	4	0	2	0	4	0	0	15
Concord, N. H	0	0	---	0	3	0	0	0	1	0	0	0
Cumberland, Md	0	0	---	0	0	0	0	0	0	0	0	1
Dallas, Texas	1	0	---	0	0	0	3	0	2	0	0	8
Denver, Colo	0	0	7	0	18	0	3	0	3	0	0	18
Detroit, Mich	1	0		0	13	0	15	4	20	0	0	109
Duluth, Minn	0	0		0	6	0	1	0	2	0	0	7
Fall River, Mass	0	0		0	1	0	1	0	4	0	0	0
Fargo, N. Dak	0	0	---	0	1	0	0	0	1	0	0	0
Flint, Mich	0	0	---	0	0	0	2	0	0	0	0	5
Fort Wayne, Ind	0	0	---	1	0	0	3	0	0	0	1	4
Frederick, Md	0	0	---	0	0	0	0	0	0	0	0	0
Galveston, Texas	0	0	---	0	0	0	2	0	0	0	0	6
Grand Rapids, Mich	0	0		0	1	0	[illegible]	1	1	0	0	14
Great Falls, Mont	0	0		0	1	0	0	0	0	0	0	3
Hartford, Conn	0	0		0	32	0	0	0	0	0	0	11
Helena, Mont	0	0		0	0	0	0	0	0	0	0	0
Houston, Texas	2	0		0	1	0	7	0	2	0	1	4
Indianapolis, Ind	0	0		0	8	0	1	3	0	0	0	13
Kansas City, Mo	0	0	---	2	3	0	1	0	3	0	0	6
Kenosha, Wis	0	0	---	0	3	0	0	0	0	0	0	13
Little Rock, Ark	---	---	---	---	---	---	---	---	---	---	---	---
Los Angeles, Calif	2	0	10	0	58	0	8	0	10	0	2	17
Lynchburg, Va	0	0		0	0	0	0	0	1	0	1	13
Memphis, Tenn	0	0	1	1	12	0	3	1	2	0	0	7
Milwaukee, Wis	0	0	---	0	152	0	0	0	11	0	0	32
Minneapolis, Minn	0	0	---	0	7	0	5	0	14	0	0	4
Missoula, Mont	0	0		0	0	0	0	0	2	0	0	0
Mobile, Ala	0	0	---	0	0	0	2	1	0	0	0	0
Nashville, Tenn	0	0	---	0	3	0	3	1	0	0	1	6
Newark, N. J	0	0	---	0	32	0	7	0	5	0	0	51
New Haven, Conn	0	0	---	0	1	0	0	0	2	0	0	7
New Orleans, La	1	0		0	3	0	5	0	3	0	2	1
New York, N. Y	8	1	3	1	20	7	38	1	40	0	6	171
Omaha, Nebr	0	0	---	0	0	0	2	0	0	0	0	1
Philadelphia, Pa	0	0	1	1	15	4	21	0	33	0	3	88
Pittsburgh, Pa	0	0	---	0	1	0	11	0	10	0	2	38
Portland, Me	0	0	---	0	20	1	1	0	0	0	1	0
Providence, R. I	2	1	---	0	35	0	0	0	2	0	0	6
Pueblo, Colo	0	0	---	0	2	0	0	0	0	0	1	4
Racine, Wis	0	0	---	0	28	0	0	0	3	0	0	14
Raleigh, N. C	0	0	---	0	0	0	1	0	0	0	0	3
Reading, Pa	0	0	---	0	1	0	1	0	0	0	0	14
Richmond, Va	0	0	---	0	0	0	0	0	1	0	1	5

City reports for week ended July 18, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Roanoke, Va	0	0	----	0	1	0	0	0	0	0	1	4
Rochester, N. Y.	0	0	----	0	1	0	1	0	5	0	0	16
Sacramento, Calif	2	1	----	0	1	0	1	0	0	0	0	28
Saint Joseph, Mo	0	0	----	0	0	0	2	0	1	0	0	0
Saint Louis, Mo	0	0	----	0	2	0	7	0	3	0	0	4
Saint Paul, Minn	0	0	----	0	15	0	3	0	1	0	0	24
Salt Lake City, Utah	0	0	----	0	70	0	0	0	2	0	0	12
San Antonio, Tex	0	0	----	1	3	0	2	0	0	0	0	2
San Francisco, Calif	0	0	1	0	76	0	9	0	5	0	0	5
Savannah, Ga	0	0		1	1	0	0	0	0	0	0	5
Seattle, Wash	1	0	----	0	96	0	3	0	1	0	1	9
Shreveport, La	0	0	----	0	0	0	7	0	0	0	0	1
South Bend, Ind	0	0	----	0	0	0	0	0	1	0	0	13
Spokane, Wash	0	0	----	0	33	0	1	0	4	0	0	6
Springfield, Ill	0	0	----	0	0	0	0	0	1	0	0	0
Springfield, Mass	0	0	----	0	6	0	3	0	3	0	0	1
Superior, Wis	0	0	----	0	3	0	0	0	0	0	0	0
Syracuse, N. Y	0	0	----	0	88	0	2	0	0	0	0	21
Tacoma, Wash	0	0		0	14	0	3	0	2	0	0	0
Tampa, Fla	0	0	----	0	0	0	1	0	2	0	2	0
Terre Haute, Ind	0	0	----	0	0	0	1	0	0	0	0	0
Topeka, Kans	0	0	----	0	5	0	2	0	2	0	0	6
Trenton, N. J	0	0	----	0	0	0	0	0	1	0	0	6
Washington, D. C	2	0	----	0	13	1	7	1	12	0	1	15
Wheeling, W. Va	0	0	----	0	7	0	0	0	0	0	0	3
Wichita, Kans	0	0	----	0	6	0	3	0	0	0	1	10
Wilmington, Del	0	0	----	0	1	0	0	0	1	0	0	2
Wilmington, N. C	0	0	----	1	1	0	0	0	1	0	0	23
Winston-Salem, N. C	0	0	----	0	0	0	1	0	0	0	0	3
Worcester, Mass	0	0	----	0	2	2	2	0	2	0	0	37

Anthrax.—Cases: Philadelphia, 2.
Dysentery, amebic.—Cases: Baltimore, 1; Dallas, 1; Los Angeles, 1; New York, 3.
Dysentery, bacillary.—Cases: Atlanta, 1; Bridgeport, 1; Dallas, 3; Detroit, 1; Los Angeles, 1; Nashville, 2; New York, 4; Philadelphia, 1; Richmond, 4; St. Louis, 1.
Rocky Mountain spotted fever.—Cases: Baltimore, 1; San Francisco, 1.
Typhus fever.—Charleston, S. C., 1; Dallas, 1; Houston, 2; Los Angeles, 1.

Rates (annual basis) per 100,000 population, for the group of 89 cities in the preceding table (estimated population, 1942, 34,044,728)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended July 18, 1942	4.75	6.28	1.84	157.75	41.51	48.86	0.00	5.05	198.65
Average for week 1937-41	10.68	4.02	1.70	[1] 206.02	39.16	56.19	0.62	6.66	209.58

[1] Median.

PLAGUE INFECTION IN CALIFORNIA

Plague infection has been proved in specimens collected in California as follows:[1]

Modoc County: July 3, in tissue from 1 ground squirrel, *C. oregonus*, taken in the Modoc National Forest, 9 miles west of Likely.

Monterey County: June 23, in a pool of 43 fleas from 10 ground squirrels, *C. beecheyi*, taken on the Fort Ord Military Reservation, 12 miles southwest of Salinas; June 24, pool of 104 fleas from squirrels, same species, taken from same locality; June 25, pool of 46 fleas from 21 squirrels, same species, taken on a ranch 13 miles southwest of Salinas; June 26, pool of 155 fleas from 21 squirrels, same species, taken on the Fort Ord Military Reservation, 6 miles southwest of Salinas; June 30, pool of 390 fleas from 57 squirrels, same species, taken on the Fort Ord Military Reservation, 12 miles southwest of Salinas; July 10, pool of 200 fleas taken from 30 squirrels, same species, taken in same locality.

San Luis Obispo County: June 9, in a pool of 199 fleas from 12 ground squirrels, *C. beecheyi*, taken on the Newhall Land and Farming Co. property, 2½ miles north and 8 miles east of Santa Maria.

San Mateo County: June 8, in a pool of 2 fleas from 1 ground squirrel, *C. beecheyi*, taken ½ mile west of Colma; June 9, pool of 33 fleas from 1 squirrel, same species, taken on the Skyline Boulevard, Alpine district; June 10, pool of 5 fleas from 1 squirrel, same species, taken [illegible] mile east of Atherton; June 11, pool of 18 fleas from 2 squirrels, same species, taken ½ mile west of Brisbane; June 12, pool of 11 lice from 1 squirrel, same species, taken 2½ miles west of San Bruno; June 15, pool of 20 fleas from 1 squirrel, same species, taken 1 mile west of Redwood City.

Santa Barbara County: June 8, in a pool of 51 fleas from 2 ground squirrels, *C. beecheyi*, taken at Camp Cook, on Santa Ynez River, 9 miles south of Casmalia.

Santa Clara County: April 8, in a pool of 200 fleas from 11 ground squirrels, *C. beecheyi*, taken 3 miles southwest of Morgan Hill.

Ventura County: June 24, in a pool of 135 fleas from 6 ground squirrels, *C. beecheyi*, taken on the Pacific Western property, 2 miles northeast of Piru; July 2, pool of 596 fleas from 40 ground squirrels, same species, taken on the Chanslor-Canfield Midway Oil Co. lease 8 miles west of Ventura.

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[1] Dates are those on which the specimens were collected

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended July 4, 1942.—During the week ended July 4, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	---	1	6	1	1		---	---	3	12
Chickenpox	---	---	---	22	222	53	24	17	45	383
Diphtheria	---	6	---	16	4	7	1	1	---	35
Dysentery	---	---	---	1	---	---	---	---	3	4
Encephalomyelitis	---	---	---			---	1		---	1
German measles	---	---	---	12	22	---	6	34	1	75
Influenza	---	---	---		9		1		6	16
Measles	---	2	---	4	256	57	12	23	17	371
Mumps	---	13	---	3	205	25	55	32	129	462
Pneumonia	---	1	---	---	6	-		.	6	13
Poliomyelitis	---	-				1			.	1
Scarlet fever	---	4	13	17	111	14	23	35	22	239
Tuberculosis	4	4	11	162	37	-	---	1	32	251
Typhoid and paratyphoid fever	---	---	2	12	5	---	---	-	1	20
Undulant fever	---	---	---	1	1	-	---	-	-	2
Whooping cough	---	---	---	165	60	3	---	2	48	278
Other communicable diseases	---	---	---	3	205	98	1		3	310

GREAT BRITAIN

England and Wales—Infectious diseases—13 weeks ended April 4, 1942.—During the 13 weeks ended April 4, 1942, cases of certain infectious diseases were reported in England and Wales as follows:

Disease	Cases	Disease	Cases
Diphtheria	11,561	Puerperal pyrexia	2,184
Dysentery	1,701	Scarlet fever	15,068
Ophthalmia neonatorum	1,065	Typhoid and paratyphoid fever	226
Pneumonia	15,875		

England and Wales—Vital statistics—First quarter 1942.—The following vital statistics for the first quarter of 1942 for England and Wales are taken from the Quarterly Return of Births, Deaths, and Marriages, issued by the Registrar-General and are provisional:

	Number	Annual rate per 1,000 population		Number	Annual rate per 1,000 population
Live births	158,201	15.5	Deaths under 1 year of age	9,697	[1] 61
Stillbirths	5,636	.55	Deaths from diarrhea (under 2 years of age)	778	[1] 4.9
Deaths, all causes	151,070	14.8			

[1] Per 1,000 live births

NOTE.—All deaths are of civilians only.

England and Wales—Vital statistics—Year 1941.—The following vital statistics for the year 1941 for England and Wales are taken from the Quarterly Return of Births, Deaths, and Marriages, issued by the Registrar-General and are provisional:

	Number	Annual rate per 1,000 population		Number	Annual rate per 1,000 population
Live births	587,228	14.2	Deaths from—Continued.		
Stillbirths	20,902	.50	Influenza	6,866	----
Deaths, all causes	524,434	----	Measles	1,142	----
Deaths under 1 year of age	34,550	[1] 59	Scarlet fever	131	----
Deaths from:			Typhoid and paratyphoid fever	146	----
Diarrhea and enteritis	2,985	[1] 5.1			
Diphtheria	2,622	----	Whooping cough	2,383	----

[1] Per 1,000 live births.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Typhus Fever

Algeria.—Typhus fever has been reported in Algeria as follows: June 11–20, 1942, 1,568 cases; June 21–30, 1,145 cases.

Hungary.—Typhus fever has been reported in Hungary as follows: Weeks ended June 20, 1942, 13 cases; June 27, 13 cases; July 4, 17 cases; July 11, 13 cases.

Iran.—For the week ended May 9, 1942, 124 cases of typhus fever were reported in Iran.

Morocco.—Typhus fever has been reported in Morocco as follows: Week ended June 27, 1942, 792 cases; week ended July 11, 1942, 451 cases.

Tunisia.—Typhus fever has been reported in Tunisia as follows: June 11–20, 1942, 397 cases; June 21–30, 1942, 523 cases.

COURT DECISIONS ON PUBLIC HEALTH

Pasteurized milk—prohibition of sale in city unless pasteurized therein.—(California District Court of Appeal, Fourth District; *Van Gammeren et al.* v. *City of Fresno et al.*, 124 P.2d 621; decided April 13, 1942.) Included in an ordinance of the city of Fresno regulating the sale of milk was a provision making it unlawful to sell or deliver in the city any pasteurized milk or cream for drinking purposes unless it had been pasteurized within the city and under the inspection required by the ordinance. The plaintiffs were processors and deliverers of milk for human consumption and each operated a pasteurizing plant outside of Fresno, the farthest plant being 4 miles distant from the city limits. The plaintiffs' dairies were regularly inspected by the milk inspection service of the city of Fresno acting as the inspection service of Fresno county. An action was brought by plaintiffs to enjoin the city and certain of its officials from preventing plaintiffs from delivering their milk in Fresno for the sole reason that their pasteurization plants were outside the limits of Fresno.

The question presented to the California District Court of Appeal was the validity of the above-mentioned portion of the city milk ordinance, and the court's holding was that such portion of the ordinance was void. In its opinion the court quoted from a prior decision of the California Supreme Court in which the conclusion had been reached that a portion of another city ordinance, in every respect similar to the portion of the Fresno ordinance in question in the instant case, was discriminatory, unreasonable, and void. In the case quoted from, the supreme court had said that it had been held quite generally that the city limits as the boundary line outside of which plants could not be located if the milk was to be sold within the city did not have a reasonable relationship to a proper legislative object and that, therefore, ordinances fixing such a boundary were invalid.

Workmen's occupational diseases act—right of action to employee for injury to health—term "negligence" construed.—(Illinois Appellate Court, First District, Second Division; *Grutzius* v. *Armour & Co. of Delaware, Inc.*, 38 N.E.2d 773; decided December 30, 1941, rehearing denied January 20, 1942.) Section 3 of the Workmen's Occupational Diseases Act of Illinois provided in part as follows: "Where an employee in this State sustains injury to health or death by reason of a disease contracted or sustained in the course of the employment and proximately caused by the negligence of the employer, unless such employer shall have elected to provide and pay compensation as provided in section 4 of this act, a right of action shall accrue to the employee whose health has been so injured for any damages sustained thereby; * * * provided, that violation by any employer of any

effective rule or rules made by the industrial commission pursuant to the Health and Safety Act, enacted by the 59th general assembly at the 3rd special session, or violation by the employer of any statute of this State, intended for the protection of the health of employees, shall be and constitute negligence of the employer within the meaning of this section."

In an action to recover damages predicated upon this section the plaintiff's theory was that the section gave a right of action to an employee who suffered an occupational disease caused through the employer's negligence without regard to any effective rule of the industrial commission or any statute, intended for the protection of the health of employees. In other words the plaintiff's contention was that "the specific negligence" defined in the proviso was "an addition to the general negligence provided for in the first part of the section" and that the word "provided" was not used in a technical sense but really meant "and or also." The defendant's answer to this was that the right of action of an employee under the section was limited to negligence of the employer as defined in the proviso.

The appellate court agreed with the defendant, saying that it seemed perfectly obvious that the word "provided" was used in its ordinary sense and that the legislature clearly intended to qualify the word negligence appearing in the first part of section 3 to mean negligence as defined in the proviso. The use of the imperative language "shall be and constitute negligence" and the phrase "within the meaning of this section" was, according to the court, significant of the intention of the legislature to define the word negligence as used in section 3 to mean the violation by an employer of (a) any effective rule made by the industrial commission pursuant to the Health and Safety Act or (b) any statute, intended for the protection of the employees' health.

New York City Sanitary Code—State legislative power not delegated.—(New York Court of Appeals; *People, on Complaint of Yonofsky,* v. *Blanchard,* 42 N. E. 2d 7; decided April 30, 1942.) The sanitary code of the city of New York was formulated by the city board of health pursuant to authority conferred by the city charter. It was provided in the charter that any violation of the sanitary code should be treated and punished as a misdemeanor, and the penal law contained a like provision that a person who wilfully violated or refused or omitted to comply with any lawful order or regulation prescribed by any local board of health or local health officer was guilty of a misdemeanor. The defendant, who had been convicted of violating the said sanitary code, contended that these enactments delegated to a local health board the legislative power to define criminal offenses and to prescribe

penal discipline therefor, thereby violating the State constitutional provision that the legislative power of the State should be vested in the legislature.

The Court of Appeals of New York said that, within limits that were to be measured by tradition, the State could commit to local governments the power to regulate local affairs and that on that basis the main business of safeguarding the public health had always of necessity been done by local boards or officers through sanitary by-laws or ordinances which had been accorded the force of law. "Consequently the sanitary code is to be taken to be a body of administrative provisions sanctioned by a time-honored exception to the principle that there is to be no transfer of the authority of the legislature." It was true, according to the court, that the substantive law making power of the people was vested by the constitution in the legislature and could not be delegated and that the definition of criminal offenses and the prescription of punishment therefor were part of that legislative power. "So, the legislature has declared that no act or omission is a crime except as prescribed by statute." But the court took the view that there had been no infringement of these standards in the instant case. The city board of health had not been licensed to define any criminal offense. It was the city charter and the penal law that made any violation of the sanitary code a misdemeanor. "On that score, the sanitary code merely says that any violation thereof shall be punished in the manner prescribed by the charter and by the penal law."

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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DISTRIBUTION OF HEALTH SERVICES IN THE STRUCTURE OF STATE GOVERNMENT *

CHAPTER VI—MEDICAL AND DENTAL CARE BY STATE AGENCIES

By JOSEPH W. MOUNTIN, *Assistant Surgeon General*, and EVELYN FLOOK, *United States Public Health Service*

In this article—the sixth chapter of the third edition of Public Health Bulletin No. 184, "Distribution of Health Services in the Structure of State Government"— attention will be devoted to a group of health activities in which medical or custodial care is the dominant element. Those included are psychiatric services, services to crippled children, general and other allied special medical care, and dentistry. It is recognized, of course, that certain health functions to which separate chapters have been devoted, such as those for communicable diseases, tuberculosis, venereal diseases, and maternity and child health, also may contain large elements of medical care. Because the medical benefits involved in provisions for workingmen's compensation are restricted to a selected population group and not applicable to the general population, these, too, will be treated separately.

The method of presentation selected for material included in this chapter as well as others of the series was determined in part by the professional skills involved, but more particularly by the prevailing scheme of administration under which the several services operate. Although stated in each of the preceding chapters, it is necessary to

*From the States Relations Division This is the first section of the sixth chapter of the third edition of Public Health Bulletin No. 184. The three remaining sections of this chapter, Medical Care for General and Allied Special Conditions, Dental Services, and Expenditures for Medical and Dental Care, will be published in the next issue of PUBLIC HEALTH REPORTS Previous chapters are

Mountin, Joseph W., and Flook, Evelyn Distribution of health services in the structure of State government—Chapter I. The composite pattern of State health services Pub. Health Rep., 56: 1673 (August 22, 1941). Reprint No. 2306.

Mountin, Joseph W., and Flook, Evelyn: Distribution of health services in the structure of State government—Chapter II. Communicable disease control by State agencies. Pub. Health Rep, 56: 2233 (November 21, 1941). Reprint No. 2334.

Mountin, Joseph W., and Flook, Evelyn: Distribution of health services in the structure of State government—Chapter III. Tuberculosis control by State agencies. Pub. Health Rep., 57: 65 (January 16, 1942). Reprint No. 2348.

Mountin, Joseph W., and Flook, Evelyn: Distribution of health services in the structure of State government—Chapter IV. Venereal disease control by State agencies. Pub. Health Rep., 57: 553 (April 17, 1942). Reprint No. 2369.

Mountin, Joseph W., and Flook, Evelyn. Distribution of health services in the structure of State government—Chapter V. Sanitation by State agencies Pub. Health Rep., 57: 885 (June 12, 1942); and 917 (June 19, 1942). Reprint No 2386.

Succeeding chapters will be published in subsequent issues of the PUBLIC HEALTH REPORTS.

repeat for the purpose of emphasis that all data presented in the current revision of Public Health Bulletin 184 pertain to a 12-month period ending during the calendar year 1940 and describe services performed by departments of the State government. The work of voluntary agencies and of local political subdivisions within the State did not fall within the range of the survey.

PSYCHIATRIC SERVICES

From the standpoints of budget and beneficiaries, psychiatric care is the most prominent among services of State governments which are to be described in this chapter. The total annual outlay for State psychiatric services is in the neighborhood of 145 million dollars. By far the larger part of this amount is devoted to the care of patients in mental institutions, who number approximately one-half million. The ancillary services, commonly spoken of as mental hygiene, are diffused through social effort of many types; hence they are difficult to evaluate in terms of costs or beneficiaries. Some measure of diffusion of administrative responsibility for psychiatric service among the agencies of State government may be expected because of the numerous avenues of approach to the problem; but, as in the case of public health organization in general, dispersion in this particular category is greater than might reasonably be considered consistent with efficient operation. When pursuing this point through the data presented in table 1, the reader must bear in mind that he is viewing only a partial picture, since the basic survey did not encompass the activities either of voluntary agencies or of local political units.

From the standpoint of all States [1] and all psychiatric services, it will be noted that activities which relate to mental disorders are concentrated within a single agency in only about one-third of the States. The predominating administrative agency is the one variously classified as "State board of control, hospital board or commission, department of institutions, or State eleemosynary board." The department of welfare also is outstanding among the various participating agencies. Cursory inspection of table 1 would indicate that the maximum dispersion of State responsibility for psychiatric services involves four official State agencies, and that this occurs only twice. Careful study points to still more scattered responsibility, however, for the single classification "independent State hospital" sometimes represents as many as four different control units. In nine jurisdictions no central administrative body is charged with operation of State mental hospitals, but each separate institution is administered by its own board of trustees or managers who are entirely responsible and operate in complete independence of each other. In a tenth State, the

[1] The term "State" as used in the discussion which follows includes the States, the Territories, the District of Columbia, and the Virgin Islands.

mental hospitals are centrally administered, but the institution for the feebleminded is operated independently.

TABLE 1.—*Official State agencies participating in psychiatric services in each State and Territory, the District of Columbia, and the Virgin Islands**

State or Territory	Department of State government								
	Health	Welfare	Department, board, or commission of mental hygiene	Board of control, State hospital board, department of institutions, eleemosynary board, etc.	Independent State hospital	Board of eugenics control, board of sterilization	State university or college	State legislature	Other
Alabama				X		X			
Arizona				X		X			
Arkansas				X					
California				X					
Colorado		X			X [a]		X		
Connecticut	X	X			X [b]	X			
Delaware				X	X [c]				
District of Columbia	X	X							X
Florida				X					
Georgia		X				X			
Idaho		X				X			
Illinois		X							
Indiana		X							
Iowa		X		X		X			
Kansas		X				X		X	
Kentucky	X	X							
Louisiana					X [b]				
Maine [d]	X			X					
Maryland	X		X		X			X	
Massachusetts			X						
Michigan				X			X		
Minnesota		X					X		X
Mississippi				X					
Missouri				X					
Montana				X		X			
Nebraska				X					
Nevada				X					
New Hampshire		X			X [c]				
New Jersey	X			X					
New Mexico					X [c]				
New York			X						
North Carolina		X			X [b]	X			
North Dakota				X		X			
Ohio		X							X
Oklahoma				X					
Oregon				X		X	X		
Pennsylvania		X					X		
Rhode Island	X	X						X	
South Carolina	X				X [c]				
South Dakota				X		X			
Tennessee	X			X					
Texas	X			X					
Utah					X [c]				
Vermont		X	X						
Virginia		X		X			X [c]		
Washington	X			X		X			
West Virginia	X			X					
Wisconsin		X					X		
Wyoming				X					
Alaska									
Hawaii	X			X					
Puerto Rico	X					X			
Virgin Islands	X								

*Any differences between information presented in this table and corresponding entries in table 1, ch. I, of this series are the result of combining several activities originally shown separately or of further refinement of the data since publication of the initial article

[a] Three agencies of this classification participate in medical care of mental disorders

[b] Four agencies of this classification participate in medical care of mental disorders

[c] Two agencies of this classification participate in medical care of mental disorders.

[d] The department of health is really a bureau of public health subordinate to the department of health and welfare.

Although it is not the purpose of table 1 to disclose the manner in which each agency operates, it might be said at this point that interest of the State health department is usually centered in prevention and early treatment of mental disorders, through field services rather than in prolonged hospital care.

Hospitalization of mental patients on a free or part-pay basis is the State's foremost approach to the problem of mental disorders. With the single exception of the Territory of Alaska, every jurisdiction operates one or more hospitals for the care of persons who are mentally ill. Moreover, the aggregate bed capacity of State mental hospitals surpasses the number of mental beds provided under any other auspices. This prominent position of State control in the mental hospital scene was stressed in a report published by the United States Public Health Service in 1938.[2] According to data presented therein, which applied to the year 1936, 84 percent of all mental hospital beds were located in State-owned mental hospitals. This being true, brief consideration of the relationship between population and availability of State mental hospital beds in 1940 is in order. There is wide variance among the States in the proportionate number of beds provided. For every 1,000 inhabitants, one State maintains as many as 6.6 beds, while another has as few as 0.5. The median State supports 3.3 beds per 1,000 population, while in the middle 50 percent of the jurisdictions the number ranges from 2.4 to 4.2. States having a relatively high proportion of urban population have more facilities for care of mental patients than do those which have a population that is largely rural.

In order of frequency, administration of State mental hospitals is delegated first to a board of control, department of institutions, eleemosynary board, or board of charities and correction; second, to the department of welfare; and third, to independent boards of trustees, directors, or managers. These arrangements exist in 25, 12, and 9 States, respectively. (See table 2.) A department of mental hygiene operates the State mental hospitals in 3 of the remaining States, and the health department is responsible for hospitalization of the mentally ill in an equal number. However, in one of the latter jurisdictions, the District of Columbia, mental hospital facilities referred to are operated as part of a general hospital and not as a separate institution. This ward represents only a minor fraction of the total mental beds available, for operation of the principal mental hospital is a function of the Federal, not the District, Government. In Colorado a small psychopathic hospital is operated as an adjunct to the general hospital of the State university. This facility is in addition to the

[2] Mountin, Joseph W., Pennell, Elliott H., and Flook, Evelyn. Hospital facilities in the United States I. Selected characteristics of hospital facilities in 1936. Public Health Bulletin No. 243. United States Government Printing Office, Washington, 1938.

main State mental hospital which is administered by an independent board of trustees. The health department of Hawaii supplements facilities of the department of institutions by providing a few beds in connection with a mental hygiene clinic. As mentioned previously, no mental hospital is maintained by the Territory of Alaska. Here, mental cases are committed at Federal expense to a Federally-owned mental hospital located in the State of Oregon.

TABLE 2.—*Department of State government* responsible for specific psychiatric services in each State and Territory, the District of Columbia, and the Virgin Islands*

Activity	State or Territory							
	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia
Promulgates and/or enforces State laws, rules, and regulations	4	4, 6	4	4	2, 5[b], 7	1, 2, 6	4, 5[c]	9
Promotes local mental hygiene programs	--	--	--	--	--	1	5	--
Conducts educational programs								
For the general public	--	--	--	--	--	1	5	--
For physicians	--	--	--	--	--	--	5	--
For nurses	--	--	--	--	--	--	--	--
For school teachers and/or teacher-training students	--	--	--	--	--	--	--	--
Supervises and/or provides consultation service to local organizations	--	4	--	--	2, 7	1	5	--
Furnishes financial aid to local mental hospitals	--	--	--	--	--			1
Operates a direct service program								
Operates mental hospitals	4	4	4	4	5, 7	5[b]	5	1[e]
Maintains a follow-up service for paroled or discharged patients	--	--		4	7	5[b]	5	--
Operates institutions for the feeble-minded	4	--	4[f]	4	5[e]	5	5	2
Maintains separate facilities for epileptics	--					5	--	
Hospitalizes drug addicts and/or alcoholics	--	4	4	4	5[g]	5	5	1[e]
Licenses or approves private institutions for the insane or feeble-minded	--		--	4	--	1	--	1, 9
Operates mental hygiene clinics—								
Mobile	--	--	--	4	2, 7			--
Stationary	--	--	--	4	7	1, 5[c]	5	--
Child guidance	--		--	--	2, 7	1	5	--
General		--	--	4	7	5[c]	5	--
Diagnostic and treatment		--	--	4	2, 7	1, 5[c]	5	--
Diagnostic only			--		--		--	--
In connection with out-patient departments of State mental hospitals	--		--	4	7	5[c]	5	--
Independent of State mental hospitals	--		--	--	2, 7	1		--
Makes individual examinations upon request	--	4	--	--			--	--
Provides follow-up service after clinic or individual examination	--	--	--	4	2, 7	1	--	--
Makes psychometric or psychiatric examinations of school children	--	--	--	--	--	1	5[g]	--
Provides psychiatric services for the courts	4	--	--	--	--	1	5	--
Makes special studies to determine incidence, cause, and/or treatment of mental disorders	--	--	--	--	--	1	--	--
Renders additional service not covered in this classification	4	4, 6	--	4	--	5, 6	4, 5	--

See footnotes at end of table.

TABLE 2.—*Department of State government responsible for specific psychiatric services in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky
Promulgates and/or enforces State laws, rules, and regulations	4	2 6	2 6	2	2	2 4 6	2 6	2
Promotes local mental hygiene programs		2		2	2			1 2
Conducts educational programs								
For the general public					2			
For physicians					2			
For nurses								
For school teachers and/or teacher-training students				2				
Supervises and/or provides consultation service to local organizations		2		2	2	4		1 2
Furnishes financial aid to local mental hospitals							8	
Operates a direct service program								
Operates mental hospitals	4	2	2	2	2	4	2	2
Maintains a follow-up service for paroled or discharged patients				2	2		2	2
Operates institutions for the feeble-minded	4	2	2	2	2	4	2	2
Maintains separate facilities for epileptics				2		2		
Hospitalizes drug addicts and/or alcoholics	4	2[illegible]	2	2[illegible]		4[illegible]		2
Licenses or approves private institutions for the insane or feeble minded				2			2	
Operates mental hygiene clinics—								
Mobile				2	2		2	
Stationary				2				
Child guidance				2	2	[illegible]	2	
General					2		2	
Diagnostic and treatment				2	2		2	
Diagnostic only								
In connection with out patient departments of State mental hospitals				2	2		2	
Independent of State mental hospitals				2	2			
Makes individual examinations upon request		2				2 4		
Provides follow-up service after clinic or individual examination				-	2	2 4		
Makes psychometric or psychiatric examinations of school children		2[illegible]			2			
Provides psychiatric services for the courts							2	
Makes special studies to determine incidence cause, and/or treatment of mental disorders		2						1
Renders additional service not covered in this classification		6	6	2	2	4 6	2 6	

See footnotes at end of table

TABLE 2.—*Department of State government responsible for specific psychiatric services in each State and Territory, the District of Columbia and the Virgin Islands*—Continued

Activity	State or Territory							
	Louisiana	Maine [a]	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri
Promulgates and/or enforces State laws rules and regulations	[d]	4	3	3	4	[illegible]	4	4
Promotes local mental hygiene programs			1 3	3				
Conducts educational programs								
For the general public			1 3	3				
For physicians								
For nurses								
For school teachers and/or teacher training students				3				
Supervises and/or provides consultation service to local organizations			3	3	4			
Furnishes financial aid to local mental hospitals			[illegible]		4			4
Operates a direct service program								
Operates mental hospitals	5[b]	4	3	3	4	2	4	4
Maintains a follow up service for paroled or discharged patients		4	3	3	4	2		4
Operates institutions for the feeble-minded	5	4	5	3	4	2	4	4
Maintains separate facilities for epileptics				3	4	2		
Hospitalizes drug addicts and/or alcoholics	5[e]	4	3	3	4	2	4	4
Licenses or approves private institutions for the insane or feeble minded		1	3	3	4			
Operates mental hygiene clinics—								
Mobile			1 3	3				
Stationary	5[e]			3	4	7		
Child guidance			1 3	3	4			
General	5[e]		1 3	3	4	7		
Diagnostic and treatment			1 3	3	4	7		
Diagnostic only	5[e]							
In connection with out patient departments of State mental hospitals	5[e]			3	4			
Independent of State mental hospitals			1 3	3	4	[illegible]		
Makes individual examinations upon request						2	4	
Provides follow up service after clinic or individual examination				3	4[g]			
Makes psychometric or psychiatric examinations of school children				3[g]	4			
Provides psychiatric services for the courts			1 3	3	4	2		
Makes special studies to determine incidence cause and/or treatment of mental disorders					7	[illegible]		
Renders additional service not covered in this classification		4	3[f]		4	2 9	4	

See footnotes at end of table

TABLE 2.—*Department of State government responsible for specific psychiatric services in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina
Promulgates and/or enforces State laws, rules, and regulations	4, 6	4	4	5[c]	4	5[e]	3	2, 5[d], 6
Promotes local mental hygiene programs	----	----	----	----	4	----	3	2
Conducts educational programs								
For the general public	----	----	----	----	1, 4	----	3	----
For physicians	----	----	----	----		----	-	----
For nurses	----	----	----	----	1	----	3	----
For school teachers and/or teacher-training students	----	----	----	----	1	----	----	----
Supervises and/or provides consultation service to local organizations	----	----	----	----	----	----	3	2
Furnishes financial aid to local mental hospitals	----	----	----	----	4	----	----	----
Operates a direct service program:								
Operates mental hospitals	4	4	4	5	4	5	3	5[b]
Maintains a follow-up service for paroled or discharged patients	----	4	----	5	4	----	3	----
Operates institutions for the feeble-minded	4	4	----	5	4	5	3	5
Maintains separate facilities for epileptics	-	----	----	----	4	----	3	----
Hospitalizes drug addicts and/or alcoholics	4	4	4	5	4[g]	----	----	5
Licenses or approves private institutions for the insane or feeble-minded	----	----	----	2	4	----	3	2
Operates mental hygiene clinics—								
Mobile	----	----	----	----	4	----	3	----
Stationary	----	4	----	5	4	----	3	2
Child guidance	----	----	----	5	----	----	3	2
General	----	4	----	5	4	----	3	2
Diagnostic and treatment	----	-	----	5	----	----	3	2
Diagnostic only	----	4	----	--	4	----	----	----
In connection with out-patient departments of State mental hospitals	----	4	----	5	4	----	3	----
Independent of State mental hospitals	----	----	----	----	----	----	----	2
Makes individual examinations upon request	----	----	----	----	-	----	----	----
Provides follow-up service after clinic or individual examination	----	----	----	5	4	----	3	2
Makes psychometric or psychiatric examinations of school children	----	----	----	5	--	----	3	----
Provides psychiatric services for the courts	----	----	----	5	----	----	----	2
Makes special studies to determine incidence, cause, and/or treatment of mental disorders	----	-	----	----	4	----	3	----
Renders additional service not covered in this classification	6	4	----	5	----	----	----	5, 6

See footnotes at end of table.

TABLE 2.—*Department of State government responsible for specific psychiatric services in each State and Territory, the District of Columbia, and the Virgin Islands*— Continued

Activity	State or Territory							
	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota
Promulgates and/or enforces State laws, rules, and regulations	4, 6	2	4	4, 6	2	2	1, 5 •	4, 6
Promotes local mental hygiene programs	---	2	---	---	---	---	5	---
Conducts educational programs.								
For the general public	---	---	---	---	2	---	5	---
For physicians	---	---	---	---	2, 7	---	---	---
For nurses	---	---	---	---		---	---	---
For school teachers and/or teacher-training students	---	---	---	7	2	---	---	---
Supervises and/or provides consultation service to local organizations	---	2	---	7	2	1, 2	5	---
Furnishes financial aid to local mental hospitals	---	2	---	---	2	8	---	---
Operates a direct service program.								
Operates mental hospitals	4	2	4	4	2	2	5	4
Maintains a follow-up service for paroled or discharged patients		2	4	4	2	2	5	---
Operates institutions for the feeble-minded	4	2	4	4	2	2	5	4
Maintains separate facilities for epileptics		2	---		2	---	---	---
Hospitalizes drug addicts and/or alcoholics	4		---	4 ■	2	2	---	4
Licenses or approves private institutions for the insane or feeble-minded	---	2	---	---	2	1	---	---
Operates mental hygiene clinics—								
Mobile	---	2					5	---
Stationary	---	2	4	7	2	2		---
Child guidance		2			2		5	---
General	---	2	4	7	2	2	5	---
Diagnostic and treatment	---	2			2	2	5	---
Diagnostic only	---		4	7	---		---	---
In connection with out-patient departments of State mental hospitals	---	2	4		2	2	5	---
Independent of State mental hospitals	---	2	---	7	---		---	---
Makes individual examinations upon request	---	9	---	---		---	---	---
Provides follow-up service after clinic or individual examination	---	---	---	---	2	2	5	---
Makes psychometric or psychiatric examinations of school children	---	---	---				5 ■	---
Provides psychiatric services for the courts	---	2	---	7	2	2	• 5	---
Makes special studies to determine incidence, cause, and/or treatment of mental disorders	---	---	---	---	2	---	---	---
Renders additional service not covered in this classification	4	---	4	6	---	---	1	4

See footnotes at end of table.

TABLE 2.—*Department of State government responsible for specific psychiatric services in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin
Promulgates and/or enforces State laws, rules, and regulations	1, 4	4	5 [c]	2	2, 4	4, 6	1, 4	2, 7
Promotes local mental hygiene programs	1	1					------	--- -
Conducts educational programs								
For the general public		1			2		----	- -
For physicians						1	--	7
For nurses		1				1		- -
For school teachers and/or teacher training students		1			2			-
Supervises and/or provides consultation service to local organizations	1	1		2	2	1	-	2
Furnishes financial aid to local mental hospitals				3				2
Operates a direct service program								
Operates mental hospitals	4	4	5	2	4	4	4	2
Maintains a follow-up service for paroled or discharged patients			5			4		2
Operates institutions for the feeble-minded	4	4	5	2	4	4	4	2
Maintains separate facilities for epileptics		4						-
Hospitalizes drug addicts and/or alcoholics	4 [g]	4	5	2	4	4	4 [g]	2
Licenses or approves private institutions for the insane or feeble minded				3			4	-
Operates mental hygiene clinics—								
Mobile		1		2	2			
Stationary					4, 7 [c]			2, 7
Child guidance		1		2				7
General					2, 4 7 [c]			2
Diagnostic and treatment				2	7 [c]			7
Diagnostic only		1			2, 4			2
In connection with out-patient departments of State mental hospitals					4			2
Independent of State mental hospitals		1		2	2, 7 [e]	-		7
Makes individual examinations upon request			5			- -	--	7
Provides follow-up service after clinic or individual examination				2	--- ---	-- ---	-----	----
Makes psychometric or psychiatric examinations of school children				-		------	------	-----
Provides psychiatric services for the courts			5		2, 7 [e]	-----	----	2
Makes special studies to determine incidence, cause, and/or treatment of mental disorders	1				--	-	----	7
Renders additional service not covered in this classification			5	2	4	4, 6	1	2

See footnotes at end of table.

TABLE 2.—*Department of State government responsible for specific psychiatric services in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory				
	Wyoming	Alaska	Hawaii	Puerto Rico	Virgin Islands
Promulgates and/or enforces State laws, rules, and regulations	4	-	1, 4	1, 6	1
Promotes local mental hygiene programs	-	-	1	-	-
Conducts educational programs					
For the general public		-	1	-	-
For physicians		-	-	-	-
For nurses	-	-	-	-	-
For school teachers and/or teacher-training students	-	-	1	-	-
Supervises and/or provides consultation service to local organizations	-	-	1	-	-
Furnishes financial aid to local mental hospitals	-		1	-	-
Operates a direct service program					
Operates mental hospitals	4	-	1[e], 4	1	1
Maintains a follow-up service for paroled or discharged patients			1	1	-
Operates institutions for the feeble-minded	4	-	4	-	-
Maintains separate facilities for epileptics				-	-
Hospitalizes drug addicts and/or alcoholics	4	-	1, 4	-	-
Licenses or approves private institutions for the insane or feeble-minded	-	-	4	-	-
Operates mental hygiene clinics—					
Mobile	-	-	1	-	-
Stationary	-	-	1	-	-
Child guidance	-	-	1	-	-
General	-	-	1	-	-
Diagnostic and treatment	-	-	1	-	-
Diagnostic only	-			-	-
In connection with out-patient departments of State mental hospitals	-	-	-	-	-
Independent of State mental hospitals	-	-	1	-	-
Makes individual examinations upon request	-	-		-	-
Provides follow-up service after clinic or individual examination	-	-	1	-	-
Makes psychometric or psychiatric examinations of school children	-	-		-	-
Provides psychiatric services for the courts	-	-	1	-	-
Makes special studies to determine incidence, cause, and/or treatment of mental disorders	-	-	-	-	-
Renders additional service not covered in this classification	-	-	4	-	-

*Code
1. Health department
2. Department of welfare, social security, or public assistance
3. State board, department, or commission of mental hygiene
4. State board of control, department of institutions, hospital board or commission, eleemosynary board, board of examiners, board of affairs, board of charities and correction
5. Independent State hospital (separate board of trustees, directors, or managers responsible for each State mental institution)
6. Board of eugenics control, board of sterilization, institutional board of health, State board of medical examiners
7. State university or college
8. State legislature
9. Other departments of State government

[a] The department of health is really a bureau of public health subordinate to the department of health and welfare
[b] Three separate agencies of this classification function in this capacity
[c] Two separate agencies of this classification function in this capacity
[d] Four separate agencies of this classification function in this capacity.
[e] Separate mental ward in a State general hospital, for acute cases only, in connection with a mental hygiene clinic.
[f] Separate ward or colony in a State mental hospital
[g] Not routinely· Under certain conditions, occasionally, upon request.

The regulatory control exercised by State agencies which render any form of psychiatric service is associated largely with admission to or release from State mental hospitals. Although admission policies are extremely diverse in detail, they may be classified broadly as voluntary admissions, court commitments, and emergency commitments. About two-fifths of the States admit patients by all three

methods; approximately the same number honor voluntary admissions and court commitments; and in the remaining States only court-committed cases are accepted. States vary as to whether court commitments are based upon the findings of one physician, two physicians, or a special sanitary board or commission. These special commissions may be composed entirely of physicians, or their membership may include a lawyer, clerk of the court, county judge, or other nonmedical person. States also differ with respect to the weight attached to petitions and statements of friends and relatives in the course of commitment procedures. Where observation periods are provided for, the usual term of observation by the hospital staff is limited to 30 days.

Fiscal arrangements governing admission to State mental hospitals may be made on either a free, part-pay, or full-pay basis. Theoretically, the method followed in practically all States is that whereby the patient's family pays such portion of a fixed charge as it is able, and the deficit is made up from public funds. Indigent patients committed to State mental hospitals are accepted entirely free if their responsible relatives are also without funds to aid in their support. Some twenty-odd States require the county or town from which the patient was admitted to bear a definite part, or, occasionally, all of the expense which the patient cannot meet, regardless of whether he was admitted on a free or part-pay basis. In actual operation, fees from patients are collected in only 19 States. Even here income from taxes far exceeds income from fees, while the number of patients who pay anything for their care and maintenance is shown to be far in the minority. Although about 30 percent of the States report admission of private (full-pay) patients, the number of such persons hospitalized in State institutions is exceedingly small. No inquiry was made into the treatment methods employed by the various State mental hospitals. That some concentrate upon custodial rather than therapeutic services is known, but evaluation of performance does not fall within the scope of this study.

While in a few jurisdictions outright discharge of patients from State mental hospitals is practiced, the parole system of discharge is provided for by most States. According to the latter arrangement, a patient is dismissed conditionally upon the discretion of the hospital superintendent and/or medical staff. Length of the parole period ranges from 3 months to 2 years. About half of the States maintain a follow-up service for paroled or discharged patients. Such service is sometimes administered through the out-patient department of the hospital and sometimes through field workers employed for this purpose

Facilities for the feeble-minded in most instances are set up as separate institutions rather than as wards within State mental hospitals.

Provisions for epileptics, on the other hand, are usually an integral part of either the mental hospital or the feeble-minded colony. About four-fifths of the States admit nonpsychotic drug addicts and alcoholics to State mental hospitals for treatment. At the same time, such admissions are often restricted to "care for a limited time," "persons having acute conditions," "persons who can pay," "voluntary patients," or—in some States—to "court-committed patients."

Twelve States, in addition to operating mental hospitals which serve the jurisdiction as a whole, make financial grants to certain local mental hospitals which accept free or part-pay patients. As a rule, the subsidy fund is administered by the same agency that operates the State institutions, but this is not always the case. For instance, in 3 States the grants are made directly by the State legislature to each local hospital, while in another the department of welfare controls the State mental hospital but a special board for the insane is charged with subsidization of local institutions. Licensure or approval of private institutions for the insane is a function of 6 departments of welfare, 5 boards of control or departments of institutions, 4 health departments, and 4 departments, boards, or commissions of mental hygiene. Such approval is sometimes based upon close supervision and in other instances it represents little more than routine registration.

In an effort to prevent propagation by mentally defective persons, over half of the States—under prescribed conditions—provide for eugenic sterilization of selected groups of feeble-minded or otherwise mentally defective persons. Responsibility for this phase of the control of mental disorders frequently rests directly with a special board of eugenics control, board of medical examiners, or board of institutional health rather than with the agency charged with the broader and more general phases of the problem.

Besides affording institutional care to the mentally ill and the mentally deficient, approximately half of the States were operating mental hygiene clinics during the year 1940. Such clinics offer facilities for early diagnosis and treatment of psychiatric disturbances which, if allowed to progress, frequently lead to necessity for hospitalization at a later date. In addition to the States which operated clinics, 5 other jurisdictions reported that individual psychiatric, psychological, psychometric, or neurological examinations were made upon request. Nineteen States furnished psychiatric services for the courts. Since this study is restricted to State service, facilities operated by local or voluntary agencies are not included in this count.

Most often, mental hygiene clinics are operated in connection with the out-patient departments of State mental hospitals. In some States, however, mental hygiene activities are entirely independent of the hospital program; in still others, both types of administration are spon-

sored. Clinics operated independently of the State mental hospitals are organized predominantly by welfare departments and State university hospitals, and less frequently by health departments. Health department participation in mental hygiene activities, as revealed by the information collected for this survey, was not so extensive as that described by Vogel [3] for the year following (1941). Expansion of programs is not wholly accountable for differences in the two bodies of data, however, for description of the more recent situation includes certain activities not covered in table 2 of this article.

Whereas the service rendered in a number of mental hygiene clinics is restricted to child guidance, in others the program is broader and extended to the general public. Usually, both diagnosis and treatment are offered, but in certain instances clinics are conducted solely for diagnostic purposes. Descriptive details of the clinics operated by each State are set forth in table 2. In this tabulation, likewise, the sponsoring agencies are identified. No provision is made for comparison of the number of clinics operated or of the volume of patients served in the respective States. Stationary clinics, for example, may represent a lone facility located on the institutional grounds or it may apply to a number of permanent centers situated at various points throughout a designated area. Mobile clinics may cover the services of either single or multiple itinerant staffs visiting less populous communities at stated intervals. For the most part, clinic service is available for selected areas only rather than for all sections of the State. Social workers are employed for complete follow-up of examined cases by about half of the jurisdictions which engage in mental hygiene activities.

Inasmuch as mental hygiene is a relatively new development, it is desirable that information be disseminated concerning the value of such a program. Recognizing this, about a dozen States have initiated educational programs for the purpose of acquainting the general public with the objectives of organized mental hygiene activities. Lectures to community groups, radio talks, press releases, and distr bution of literature are the educational devices usually employed. Nearly the same number of States adapt special educational measures to the interests and needs of particular professional groups which are most apt to be confronted with incipient mental disorders. Physicians, nurses, school teachers, and students in teachers' training colleges constitute these selected groups, while lectures, demonstrations, postgraduate courses, and in-service training represent the methods utilized. Responsibility for the educational features of mental hygiene programs is centered primarily in the same agency which maintains clinic facilities; occasionally, however, a health de-

[3] Vogel, Victor H.: Administrative organization for mental hygiene. Pub. Health Rep., 57: 537 (April 10, 1942).

partment engages in educational pursuits even when it has no part in actual clinic service.

Various types of research for the purpose of determining the incidence and causes of mental disorders, as well as the most effective methods of treatment and care, are included in the mental hygiene programs of 3 State health departments, 3 State universities, 2 departments of welfare, 1 department of mental hygiene, and 1 department of institutions.

RECONNAISSANCE OF ANOPHELINE LARVAL HABITATS AND CHARACTERISTIC DESMIDS OF THE OKEFENOKEE SWAMP, GEORGIA [1]

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INTRODUCTION

The absence of malaria in the Okefenokee Swamp, located in southeastern Georgia and northern Florida, may well have puzzled sanitarians. Here, surrounded by more or less malarious swamps, is a salubrious one 600 to 700 square miles in extent. Abounding in the Okefenokee is an anopheline mosquito of which an early visitor, Captain Rodenbough (cited in Wright and Bishop (*1*)) could claim a century ago that "mosquitoes sometime rise in such swarms that the trees are only seen dimly as through a dust storm." Surveys by malariologists (*2*, *3*) confirmed the reported lack of malaria, established the presence of great numbers of anophelines, showed house infestation by anophelines to be the rule, and demonstrated another unusual circumstance, viz, that all anophelines breeding in the water of the swamp belonged to a single species, *Anopheles crucians* Wiedemann. The investigators did not find *A. punctipennis* (Say). They especially emphasized the nonoccurrence of *A. quadrimaculatus* Say, the principal malaria vector in the southeastern United States. Absence of *A. quadrimaculatus*, if a fact, is certainly anomalous and significant in so large a perennially wet region located near the geographical center of this common mosquito's range (cf. *4*).

A possible explanation for the absence of *A. quadrimaculatus* and *A. punctipennis* in the Okefenokee is implicit in a recent ecological classification of anopheline breeding waters of the southeastern coastal plain based on the distribution of characteristic desmid indicator species (*5*). A "sphagnum type" pond, in which no anopheline other than *A. crucians* was observed to breed, was proposed and characterized from a study of a bog near Meinhard, Effingham County, Ga. The "sphagnum type" pond was at first considered of

[1] From the Division of Infectious Diseases, National Institute of Health

little practical importance in the region because no other ponds were known to belong to the type. From a later cursory survey of Billys Lake and two adjacent waters of the Okefenokee area it was reasonable to surmise that the entire Okefenokee Swamp and many outlying basins would, upon study, require classing with this type and that there only *A. crucians* and little or no malaria might be expected.

Collections of mosquito larvae and algae were made at 26 typical stations during 1938–39 in the following regions of the Okefenokee: Billys Lake, Billys Island ponds, Billys Island Bay, Minnes Lake, Floyds Island Prairie, Big Water, "The Canal," and Chessers Prairie. Adult mosquitoes were collected from representative shelters—buildings and hollow trees—without attempt to take large numbers (which were checked for species) when available at houses and barns.

ANOPHELINE ADULTS

Collection data tend to support the findings of Mayne (*2*, *3*). He reported, and the present work confirms, the following: (1) "The only anopheline present was *A. crucians*;" (2) "this species was seen biting in daylight, in sunshine, as well as in shade;" (3) "this species freely entered houses;" (4) "on Billys Island it far outnumbered all other species of mosquitoes;" (5) "invasion of tree stumps and hollow logs by *A. crucians* is very common;" (6) "no specimen of *quadrimaculatus* was encountered in the swamp area." Similarly, Russell (Mayne (*2*)) working in August and September on Billys Island reached conclusions similar to (1), (3), and (6) of Mayne's.

Very few male *A. crucians* were seen by Mayne and Russell in late summer. They reported sex ratios of 1 male to 127 females and 1 male to 130 females, respectively, for Billys Island. The relative paucity of males was much less marked a decade and a half later, probably because the human inhabitants and all except one of the buildings were gone. A sex ratio of 1:28 was determined, based on 264 specimens caught on the same island July 19–21, 1939. In February, when only 32 imagines could be found, the ratio had been 1:15, and in April, after emergence of a spring "brood," it had been 1:7. These data might be taken as substantiation of Mayne's contention that in the Okefenokee *A. crucians* probably produces "definite broods with little or no overlapping in generations." But, certainly, the extreme sex ratios calculated by Mayne and corroborated by Russell reflect collecting by both investigators from shelters more attractive to females than to males. Barber, Komp, and Hayne (*6*) showed that for anophelines in resting places "the more accessible the blood, the larger the percentage of females—and this factor seems to be more important in the case of *Anopheles crucians* than in the case of *Anopheles quadrimaculatus*."

ANOPHELINE LARVAE

Unlike the earlier malaria surveys which dealt principally with the disease itself and with adult anophelines, this reconnaissance had to do particularly with the aquatic habitats of anophelines. Mayne, however, "covered 30 miles of navigable water throughout the swamp territory where only a few forms of *Anopheles* were encountered." The findings of July and August 1939 record breeding evidently equally scanty but more general since a few larvae were found in the "sphagnum mats" and on the "prairies canopied with water lilies," both reported negative by Mayne. In February and March, on the other hand, larvae of all stages and pupae were not uncommon wherever sought, excepting only in the open water. The similar proportion of fourth stage larvae and pupae to smaller larvae in both months refutes Mayne's prediction of "definite broods with little or no overlapping in generations."

Larvae were invariably *A. crucians.* A few collections have been re-examined to determine race. These larvae run satisfactorily to *A. crucians crucians* King (*7*); at least the palmate hairs on abdominal segments 3 and 7 of the larger ones are but slightly reduced. This is, of course, not good evidence that *A. crucians georgianus* King, indistinguishable as imago, does not also occur in the swamp area. As noted under aquatic habitats the isolated cypress ponds on the islands were classified as belonging to a type of anopheline breeding pond studied elsewhere in Georgia and found to be tolerated by *A. quadrimaculatus*, but here as everywhere else in the Okefenokee *A. crucians* only was found.

AQUATIC HABITATS

Aquatic habitats of the Okefenokee have been differentiated by residents and biologists (*8*) as follows: (1) Shallow marshes or prairies; (2) open lakes and their borders; (3) wooded swamps or cypress bays; (4) cypress ponds; (5) runs; and others. These aquatic environments have come about largely from the original sea-bottom topography which determined depth of the water and its flow or stagnation. Without disparaging the validity and usefulness of these categories (which are correlated with the distribution of higher plants and aquatic vertebrates), it is, nevertheless, believed constructive to stress, so far as warranted, their essential sameness, chemical and microbiological. "The Okefenokee Swamp, except for its islands, open prairies, and watercourses, is just one immense sphagnum bog or morass" (*8*) (cf. *9*). Desmids, considered indicative of ecological factors important to anopheline larvae, will be shown to vary relatively little from place to place in the swamp.

The inference is that this monotony of environment and microbiotas results from chemically extreme conditions and that this same cause, or a result of it, excludes anophelines other than *A. crucians*. Such an extreme condition itself, or indicative of others, is the hydrogen-ion concentration, which ranged from pH 3.7 to 3.9 in all open waters whenever determined. Only the isolated cypress ponds of Billys Island and a well were less acid. The less acid range in reaction of four cypress ponds, pH 4.1-5.7, was correlated with paler water, considered by Welch (*10*) as probably due to a lower concentration of organic colloids responsible for the reaction. Otherwise, everywhere in the swamp the concentration of colloidal particles appeared to be constantly high. Afternoon Secchi disc readings from Billys Lake in winter and spring, which averaged 39.5 and 38 inches, respectively, are probably typical of all this unusually acid, dark water.

The concept, bog lake, is variously defined. The Okefenokee contains numerous connected "sphagnum bog lakes" as described by Welch (*10*), or highmoors with open waters (*11*), since it is characterized by sphagnum, ericaceous shrubs, high acidity, and low mineral content. However, its open waters differ from northern bog lakes described by Welch in at least two important respects: (1) The Okefenokee open waters, which are quite as acid as the waters lying over the marginal sphagnum mats, fluctuate in reaction but slightly; (2) Okefenokee waters are associated with current because of a difference in elevation (disregarding islands) of roughly 20 feet between the northeastern margins and the south central outlet.

Using the key to anopheline breeding waters in coastal Georgia and South Carolina (*5*), all Okefenokee aquatic habitats- lakes, prairies, runs, bays (excepting only cypress ponds)- classify easily as "desmid-rich class, sphagnum type." The cypress ponds are different and less invariable. Those surveyed belong to the "desmid-rich class" and the "desmid-optimum type." However, in their moderate acidity, by the presence of certain "sphagnum type" desmids and the absence of many typical "desmid-optimum type" desmids, and possibly by virtue of the nonoccurrence of anopheline larvae other than *A. crucians*, they simulate the "sphagnum type" pond.

"Sphagnum type" waters may be characterized by their floras more successfully perhaps than any other kind of anopheline breeding pond. Among the macrophytes sphagnums are dominant, especially in the ecological sense of their influence on the environment, an influence which may be even greater after death, as peat. In the peat of sphagnum bogs a "highly specific" bacterial flora thrives to great depths, according to Waksman and Stevens (*12*); this flora is characterized by the curious absence of nitrifying and aërobic cellulose decomposing species

CHARACTERISTIC DESMIDS

The preliminary list of common desmids of the Okefenokee (table 1) includes only well-marked species identified with a reasonable degree of certainty. A larger number of undetermined forms, many of them peculiar, especially closteria, staurastra, cosmaria, and euastra, await further study. The 34 named forms might be expected to be comprehended in the earlier catalog of desmids (89 forms) of anopheline breeding ponds (*5*). This is not the case. Only eighteen (53 percent) are common to both lists. Moreover Brown's (*13*) records of 225 desmids from the entire southeastern coastal plain (which did not include collections from the Okefenokee) list only 18 of these 34 desmids. In table 1 the frequency of each desmid is shown (percentage obtained by dividing the number of collections containing the species by the total number of collections).

TABLE 1.—*Common desmids and their frequencies in the Okefenokee Swamp, Ga., 1938–39*

Species	Percent	Species	Percent
I. *Arthrodesmus:*		XI. *Penium:*	
1. *incus* var. *extensus* Anders	5	1. *cucurbitinum* Biss. forma	5
2. *otocornis* Ehr.	5	2. *phymatosporum* Nordst.	10
3. *phimus* Turn. (?)	5	3. *spirostriolatum* Bark.	35
II. *Closterium:*		XII. *Phymatodocis:*	
1 *costatum* Corda	5	1. *Nordstedtiana* var. *minor* Børg.	35
III *Desmidium:*		XIII. *Spirotaenia:*	
1. *Baileyi* (Ralfs) Nordst.	5	1. *condensata* Bréb.	10
2. *quadratum* Nordst.	75	XIV. *Staurastrum:*	
IV. *Docidium:*		1. *furcigerum* Bréb. (?)	15
1. *undulatum* Bail.	15	2. *furcigerum* var. *armigerum* (Bréb) forma *gracillimum* G. M. Smith	10
V. *Euastrum:*		3. *gladiosum* Turn.	5
1 *elegans* (Bréb.) Kütz	5	4. *inconspicuum* Nordst. forma	15
2. *insigne* Hass.	5	5. *quadrispinatum* Turn.	60
3. *pinnatum* Ralfs	10	XV. *Tetmemorus:*	
VI. *Gymnozyga:*		1. *brebissonii* (Menegh.) Ralfs var. *minor* DeBary	55
1. *moniliformis* Ehr.	90	2. *laevis* (Kütz) Ralfs	10
VII. *Hyalotheca:*		XVI. *Triploceras:*	
1. *dissiliens* (Smith) Bréb.	10	1. *verticillatum* Ball.	5
VIII. *Micrasterias:*		XVII. *Xanthidium:*	
1. *conferta* Lund.	5	1. *antilopaeum* (Bréb) Kütz forma (?)	35
2. *radiosa* Ralfs	15	2. *antilopaeum* var. *minneapoliense* Wolle	30
3. *truncata* (Corda) Bréb.	50	3 *cristatum* Bréb	25
IX. *Netrium:*			
1. *digitus* (Ehr.) Itz. & Roth	40		
2. *oblongum* (DeBary) Lütk	5		
X. *Onychonema:*			
1. *laeve* var. *latum* W. & G. S. West	5		

It was evident to the writer, who has examined desmid samples from 400 or more ponds in the region, that this was a most unusual assemblage of species. To illustrate this uniqueness and to measure the degree of indicator value for the more frequent Okefenokee species, a comparison was made with 134 desmid samples (all available) from Burke, Crisp, Dougherty, Jenkins, Pulaski, and Toombs counties in Georgia kindly furnished by Dr. Justin Andrews of the Georgia State Board of Health. The samples had been collected in the same manner as the Okefenokee samples by malariologists surveying anopheline

habitats and are considered representative of the general region. In the 134 lists of species the following 10 desmids were most frequent:

		Percent
1.	*Xanthidium cristatum*	26
2.	*Hyalotheca dissiliens*	24
3.	*Micrasterias truncata*	22
4.	*Cosmarium pseudoconnatum* Nordst	22
5.	*Closterium setaceum* Ehr	20
6.	*Desmidium Aptogonum* Bréb	18
7.	*Euastrum evolutum* var. *integrius* W. & G. S. West	15
8.	*Closterium costatum*	12
9.	*Netrium digitus*	12
10.	*Gymnozyga moniliformis*	10

The species 4, 5, 6, and 7, most frequent in the general region, did not occur in the Okefenokee collections. The frequencies in the general region of the most common Okefenokee desmids are as follows, the Okefenokee frequency being given first for comparison:

	Species of desmid	Frequency (percent) Okefenokee	General region
1.	*Gymnozyga moniliformis*	90	10
2.	*Desmidium quadratum*	75	--
3.	*Staurastrum quadrispinatum*	60	1
4.	*Tetmemorus Brebissonii* var. *minor*	55	6
5.	*Micrasterias truncata*	50	22
6.	*Netrium digitus*	40	12
7.	*Penium spirostriolatum*	35	1
8.	*Phymatodocis Nordstedtiana* var. *minor*	35	1
9.	*Xanthidium antilopaeum* forma	35	--
10	*Xanthidium antilopaeum* var. *minneapoliense*	30	1
11.	*Xanthidium cristatum*	25	26

It appears certain that *Gymnozyga moniliformis*, *Micrasterias truncata*, *Xanthidium cristatum*, and *Netrium digitus* are environmentally tolerant species of low value as indicators. Apparently highly characteristic of the Okefenokee swamp are *Desmidium quadratum*, *Phymatodocis Nordstedtiana* var. *minor*, *Staurastrum quadrispinatum*, *Xanthidium antilopaeum* var. *minneapoliense*, *Xanthidium antilopaeum* forma, and *Penium spirostriolatum*.

The "sphagnum type" anopheline pond, where *A. crucians* was found breeding constantly alone, was proposed (*5*) after a survey of Bethesda Pond, a sphagnum bay about 20 miles from Savannah, Ga. This area has, like the Okefenokee, clear brown water associated with perceptible current, a reaction almost invariably more acid than pH 4.0, and relatively extensive occupation by sphagnum. The whole basin, less than a few square miles in extent, is, obviously, inconsequential by comparison with the Okefenokee, second largest swamp in the United States. The identified desmids of Bethesda, only 14

species, follow in order of frequency for the eight collections made in April 1938, and May and June 1939:

		Percent
1.	*Hyalotheca dissiliens*	62
2.	*Staurastrum quadrispinatum*	62
3.	*Staurastrum inconspicuum*	37
4.	*Tetmemorus Brebissonii* var. *minor*	37
5.	*Gymnozyga moniliformis*	25
6.	*Spondylosium planum* (Wolle) W. & G. S. West	25
7.	*Desmidium quadratum*	25
8.	*Penium spirostriolatum*	25
9.	*Euastrum obesum* Josh.	25
10.	*Micrasterias truncata*	12
11.	*Micrasterias conferta*	12
12.	*Penium cucurbitinum*	12
13.	*Xanthidium antilopaeum* forma	12
14.	*Euastrum humerosum* Ralfs	12

Four of the five desmids cited as highly characteristic of the Okefenokee reappear in Bethesda collections and are therefore considered indicators of the "sphagnum type" anopheline pond. The species are: *Desmidium quadratum*, *Staurastrum quadrispinatum*, *Xanthidium antilopaeum* forma, and *Penium spirostriolatum*. Moreover, 11 (78 percent) of the Bethesda desmids are species common to the Okefenokee. In fact, 50 percent of the Bethesda list comprise simply 7 of the 11 most frequent Okefenokee species. Why the common and ubiquitous *Netrium digitus* and *Xanthidium cristatum* were not found at Bethesda is a mystery; their absence, at any rate, like their presence, is not significant.

Some limnologists (cited by Welch (*10*)) have considered bog lake plankton a "selection biota" characterized chiefly by the absence of many common but inadequately tolerant plankters rather than by the presence of a certain few species. This hypothesis seems inapplicable to the desmids of southeastern bogs (bays) where, as the above data show, characteristic species are prominent. However, the proposal is valuable and it is informative to check the absence or scarcity in bog ponds of many desmids which are the most common and frequent species elsewhere in the region. Such negative findings aid materially in classifying ponds of the "desmid-rich class" to proper types.

Quantitative study of Okefenokee desmids, it is believed, would emphasize the peculiarity of the swamp flora indicated by this preliminary qualitative study. In default of counts, some notion of relative abundance for a few principal species of algae is afforded by notes on the numerically dominant organisms. In twelve collections a single organism predominated. The dominance of the various organisms was as follows:

The diatoms—*Eunotia tridentula* Ehr., *Frustulia rhomboides* (Ehr.) DeToni, and *Asterionella notata* Grun.	once each
A bluegreen—*Hapalosiphon pumilus* (Kütz.) Hansg.?	twice
An unidentified filamentous green alga	once
Desmids—*Phymatodocis Nordstedtiana* var. *minor* and *Gymnozyga moniliformis*	once each
Desmidium quadratum	four times

D. quadratum, it may be noted, besides having occurred in Georgia, in Okefenokee and Bethesda samples only, evidently attains maximum abundance in "sphagnum type" ponds.

DISCUSSION

Several sanitarians have recognized a proclivity manifested by some races of *Anopheles crucians* to breed in highly acid waters. Metz (*14*) reported large numbers of *A. crucians* larvae breeding in the absence of other anophelines in a swamp rendered very acid by sulfuric acid waste (148 p. p. m. sulfate). He looked in vain for the species in ponds several miles around where *A. quadrimaculatus* and *A. punctipennis* were found. Metz concluded that "the waters of the swamp possessed some peculiarity favorable to *crucians* but repellant to the other two species." Similarly, Chandler (*15*) discovered larvae of *A. crucians* breeding alone in the acid waters of a southern Illinois coal strip mine pond about 200 miles from the nearest known locality in the species' range. Although he surveyed the region for 3 years, Chandler did not find *A. crucians* in other ponds. In coastal Georgia, in the writer's experience, *A. crucians* is the chief anopheline in ponds (acid) of the "desmid-rich class," as *A. quadrimaculatus* is in ponds (slightly acid, neutral, alkaline) of the "desmid-poor class." The two species occur in conformity with this generalization even in summer when *A. quadrimaculatus* breeding is usually highest and *A. crucians* larvae are relatively scarce. It is not surprising, therefore, that *A. crucians* only, among south Atlantic coastal Anopheles, should tolerate, even thrive in, "sphagnum type, desmid-rich" bays such as Bethesda Pond and the Okefenokee Swamp.

SUMMARY

A reconnaissance of anophelines and the larval habitats in the Okefenokee Swamp in Georgia during 1938–39 corroborates and augments essential findings of previous malaria surveys, showing that *Anopheles crucians* Wied. is the only anopheline breeding in the waters of the swamp; the species far outnumbers all other mosquitoes at all seasons; the larvae and pupae are generally distributed, except on open waters; there are not definite broods; *A. crucians crucians* King is probably the chief, if not the sole, race present; *A. quadrimaculatus* Say does not occur in the swamp.

The aquatic environment was surveyed with reference to types of anopheline breeding ponds (*5*) as indicated by characteristic desmids. Data indicate:

The various aquatic habitats, almost all extensively occupied by sphagnum moss, differ little; and much the same microbiota is found all over the swamp, excepting, so far as is known, only a well and certain isolated island ponds.

The Okefenokee differs from described northern bogs in (*a*) more acid reaction of the open waters which fluctuates less (pH 3.7–3.9), (*b*) drainage by large perceptibly flowing "runs."

The aquatic habitats are classified "desmid-rich class, sphagnum type" anopheline ponds, except isolated island cypress ponds, which are "desmid-rich class, desmid-optimum type."

A preliminary list of desmids of the swamp includes peculiar species uncommon in the general region, of which *Desmidium quadratum* Nordst., *Staurastrum quadrispinatum* Turn., *Xanthidium antilopaeum* var. *minneapoliense* Wolle, *X. antilopaeum* forma, and *Penium spirostriolatum* Bark. are common forms characteristic of the swamp. These, except for *X. antilopaeum* var. *minneapoliense*, are proposed as indicators of the "sphagnum type" anopheline pond in which only *Anopheles crucians* was found to breed.

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REPORT ON MARKET-MILK SUPPLIES OF STANDARD MILK ORDINANCE COMMUNITIES [1]

Compliance of the Market-Milk Supplies of Certain Standard Milk Ordinance Communities With the Grade A Pasteurized and Grade A Raw Milk Requirements of the Public Health Service Milk Ordinance and Code, as Shown by Compliance (Not Safety) Ratings of 90 percent or More Reported by the State Milk-Sanitation Authorities During the Period July 1, 1940, to June 30, 1942

The accompanying list gives the semiannual revision of the list of certain Standard Milk Ordinance communities in which the pasteurized market milk is both produced and pasteurized in accordance with the Grade A pasteurized milk requirements of the Public Health Service Milk Ordinance and Code and in which the raw market milk sold to the final consumer is produced in accordance with the Grade A raw milk requirements of said ordinance and code, as shown by ratings of 90 percent or more reported by State milk-sanitation authorities

These ratings are not a complete measure of safety, but represent the degree of compliance with the Grade A requirements of the Public Health Service Milk Ordinance and Code. Safety estimates should also take into account the percentage of milk pasteurized, which is given in the following tables

The milk ordinance recommended by the Public Health Service is now in effect in hundreds of communities ranging in population from 1,000 to 3,500,000 and located in 35 States.

The primary reason for publishing the rating lists from time to time is to encourage these communities to attain and maintain a high level of excellence in the enforcement of this ordinance No comparison with communities operating under other milk ordinances is intended or implied.

It is emphasized that the Public Health Service does not intend to imply that only those communities on the list are provided with high-grade milk supplies. Some communities which have high-grade milk supplies are not included because arrangements have not been made for the determination of their ratings by the State milk-sanitation authority. In other cases the ratings which have been determined are now more than 2 years old and have therefore lapsed. In still other communities with high-grade milk supplies there seems, in the opinion of the community, to be no local necessity nor desire for rating or inclusion in the list, nor any reasonable local benefit to be derived therefrom.

The rules under which a community is included in this list are as follows:

(1) All ratings must have been determined by the State milk-sanitation authority in accordance with the Public Health Service

[1] From the States Relations Division

rating method (Pub. Health Rep., 53: 1386 (1938). Reprint No. 1970), based upon the Grade A pasteurized-milk and the Grade A raw-milk requirements of the Public Health Service Milk Ordinance and Code.

(2) No community will be included in the list unless both its pasteurized-milk and its raw-milk ratings are 90 percent or more. Communities in which only raw milk is sold will be included if the raw-milk ratings are 90 percent or more. Communities which receive, without local inspection, milk from other sheds will be included in the list only if the locally inspected supply, as well as the shipped-in supply, shows a rating of 90 percent or more.

(3) The rating used will be the latest rating submitted to the Public Health Service, but no rating will be used which is more than 2 years old. In order to promote continuous rigid enforcement rather than occasional "clean-up campaigns" it is suggested that when the rating of a community on the list falls below 90 percent no resurvey be made for at least 6 months, resulting in removal from the next semiannual list.

(4) The Public Health Service will make occasional check surveys of cities for which ratings of 90 percent or more have been reported by the State. If such check rating is less than 90 percent but not less than 85, the city will be removed from the 90-percent list after 6 months unless a resurvey submitted by the State during this probationary interim shows a rating of 90 percent or more. If, however, such check rating is less than 85 percent, the city will be removed from the list immediately. If the check rating is 90 percent or more, the city will be retained on the list for a period of 2 years from the date of the check survey unless a subsequent rating submitted during this period warrants its removal.

Communities are urgently advised to bring their ordinances up to date at least every 5 years, since ratings will be made on the basis of later editions if those adopted locally are more than 5 years old.

Communities which are not now on the list and desire to be rated should request the State milk-sanitation authority to determine their ratings and, if necessary, should improve their status sufficiently to merit inclusion in the list.

Communities which are now on the list should not permit their ratings to lapse, as ratings more than 2 years old cannot be used.

State milk-sanitation authorities who are not now equipped to determine municipal ratings are urged, in fairness to their communities, to equip themselves as soon as possible. The personnel required is small, as in most States one milk specialist is sufficient for the work.

TABLE 1.—*Standard Milk Ordinance communities in which all market milk is pasteurized. In these communities market milk complies with the Grade A pasteurized milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by pasteurized milk ratings of 90 percent or more* [1]

Community	Percentage of milk pasteurized	Date of rating	Community	Percentage of milk pasteurized	Date of rating
ILLINOIS			KENTUCKY		
Brooklyn [2]	100	Oct 8, 1941	Louisville	100	Jan. 31, 1942
Cahokia [2]	100	Do.	MINNESOTA		
Canteen [2]	100	Do.	Rochester	100	May 29, 1941
Centerville [2]	100	Do.	Winona	100	September 1940
Champaign	100	July 23, 1941	MISSOURI		
East St. Louis [2]	100	Oct. 8, 1941	Ladue	100	January 1942
Fairmont City [2]	100	Do.	Richmond Heights	100	Do.
National City [2]	100	Do.	St. Louis	100	June 9, 1942.
Stites [2]	100	Do.	Webster Groves	100	January 1942.
Washington Park [2]	100	Do.	NORTH CAROLINA		
Waukegan	100	Apr. 29, 1942	Greenville	100	Apr. 10, 1942.
IOWA					
Paullina	100	Jan 5, 1942			

[1] Note particularly the percentages of milk pasteurized in the various communities listed in these tables. This percentage is an important factor to consider in estimating the safety of a city's milk supply.
[2] Part of East Side Health District.

The inclusion of a community in this list means that the pasteurized milk sold in the community, if any, is of such a degree of excellence that the weighted average of the percentages of compliance with the various items of sanitation required for Grade A pasteurized milk is 90 percent or more and that, similarly, the raw milk sold in the community, if any, so nearly meets the requirements that the weighted average of the percentages of compliance with the various items of sanitation required for Grade A raw milk is 90 percent or more. However, high-grade pasteurized milk is safer than high-grade raw milk, because of the added protection of pasteurization. To secure this added protection, those who are dependent on raw milk can pasteurize the milk at home in the following simple manner: Heat the milk over a hot flame to 165° F., stirring constantly; then immediately place the vessel in cold water and continue stirring until cool.

TABLE 2.—*Standard Milk Ordinance communities in which some market milk is pasteurized. In these communities the pasteurized-market milk complies with the Grade A pasteurized-milk requirements and the raw market milk complies with the Grade A raw-milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by pasteurized- and raw-milk ratings, respectively, of 90 percent or more* [1]

[NOTE.—All milk should be pasteurized or boiled, either commercially or at home, before it is consumed See text for home method]

Community	Percentage of milk pasteurized	Date of rating
ALABAMA		
Dothan	89	Apr. 16, 1942.
Montgomery	45	Nov. 28, 1941.
Tuscaloosa	91	June 17, 1942
ARKANSAS		
El Dorado	45	September 1941.
Fayetteville	60	November 1940
Fort Smith	48	September 1940
Jonesboro	59	October 1940
Little Rock	56	October 1941.
Pine Bluff	43	November 1941
Texarkana	62	September 1941.
COLORADO		
Pueblo	59	April 1941
FLORIDA		
Coral Gables	98	May 20, 1942
Dania	95	May 1, 1942
Deerfield	95	Do
Fort Lauderdale	95	Do
Hallandale	95	Do.
Hollywood	95	Do
Homestead [2]	94	May 25, 1942.
Jacksonville	78	April 1941
Marianna	96	February 12, 1942.
Miami	98	May 20, 1942
Oakland Park	95	May 1, 1942.
Pompano	95	Do.
Tallahassee	50	September 1941.
ILLINOIS		
Chicago	99.8	Apr 11, 1941
Decatur	92	Oct. 3, 1940
Glencoe	99.6	Apr. 17, 1942
Highland Park	99.6	Do
Kenilworth	99.6	Do
Lake Bluff	99.6	Do
Lake Forest	99.6	Do.
Oak Park	99.8	Jan 17, 1941
Winnetka	99.6	Apr 17, 1942
IOWA		
Humboldt	87	Jan 12, 1942
Mt. Vernon	48	Feb 2, 1942
Sheldon	61	May 18, 1942
Washington	74	Jan. 7, 1941
Webster City	55	May 13, 1942
KANSAS		
Lawrence	84	May 29, 1942
Pratt	61	November 1941.
Wichita	72	December 1941.
KENTUCKY		
Bowling Green	68	June 12, 1941.
Glasgow	52	June 1941
Hazard	40	December 1941
Lexington	71	Mar 14, 1942
Owensboro	80	July 23, 1941.
Somerset	9	November 1940.
LOUISIANA		
Alexandria	81	Apr 24, 1942.
Monroe	41	Mar 7, 1941
Pineville	81	Apr 24 1942.
Shreveport	83	Mar 14, 1942
MICHIGAN		
Crystal Falls	41	July 24, 1940
Iron River	51	Do
Stambaugh	51	Do
MINNESOTA		
Moorhead	88	Feb 14, 1941
MISSOURI		
Brentwood	98	January 1942.
Clayton	99.8	Do
Ferguson	79	Do.
Glendale	99.3	Do.
Kirkwood	89	Do.
Maplewood	91	Do.
Overland	92	Do.
Rockhill	88	Do.
University City	99.5	Do
NEW MEXICO		
Albuquerque	77	Dec 20, 1941
Clovis	63	Mar 18, 1942
Las Cruces	54	Feb 2, 1942
Las Vegas	65	July 18, 1941.
Taos	42	Mar. 6, 1942
NORTH CAROLINA		
Asheboro	63	Nov. 6, 1941
Asheville	76	May 1942
Bethel	17	April 10, 1942.
Biltmore Forrest	70	May, 1942
Black Mountain	70	Do
Concord	57	June 27, 1942
Durham	91	October 1940
Enka	70	May 1942
Farmville	5	April 10, 1942
Fayetteville	73	May 7, 1942.
Greensboro	86	August 1940
Hendersonville	61	May 30, 1942.
High Point	94	July 17, 1941
Hope Mills	73	May 7, 1942.
Kannapolis	57	June 27, 1942.
Kinston	12	July 9, 1940.
Mars Hill	15	Jan 10, 1941
Mt Pleasant	57	June 27, 1942
Roxboro	32	Jan 16, 1942
Swannanoa	70	May 1942
Weaverville	70	Do
NORTH DAKOTA		
Fargo	91	Feb. 16, 1941.
Valley City	33	July 24, 1941
OHIO		
Athens	80	July 6, 1940.

[1] Note particularly the percentage of milk pasteurized in the various communities listed in these tables. This percentage is an important factor to consider in estimating the safety of a city's milk supply.
[2] Has not adopted the milk ordinance recommended by the Public Health Service.

TABLE 2.—*Standard Milk Ordinance communities in which some market milk is pasteurized. In these communities the pasteurized-market milk complies with the Grade A pasteurized-milk requirements and the raw market milk complies with the Grade A raw-milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by pasteurized- and raw-milk ratings, respectively, of 90 percent or more*—Continued

[NOTE.—All milk should be pasteurized or boiled, either commercially or at home, before it is consumed See text for home method]

Community	*Percentage of milk pasteurized*	*Date of rating*
OKLAHOMA		
Ada	74	Feb. 3, 1942.
Bartlesville	63	Jan 21, 1942.
Blackwell	38	Nov. 15, 1941.
Muskogee	88	May 17, 1942.
Okmulgee	64	Apr 8, 1942
Shawnee	48	Mar. 26, 1942.
Tulsa	83	May 20, 1942.
Wewoka	52	July 8, 1940.
OREGON		
Astoria	78	June 20 1941.
Eugene	60	Nov. 1, 1940
Portland	82	June 16, 1942
Seaside	68	June 20, 1941.
TENNESSEE		
Bristol	80	December 1941
Memphis	90	December 1940
TEXAS		
Amarillo	78	Aug 12, 1940
Brownwood	64	May 31, 1941.
Bryan	14	July 20, 1940
Canyon	42	Aug 9, 1940.
Fort Worth	93	June 5, 1942.
Gainesville	65	Mar 31, 1942.
Lamesa	47	Mar 26, 1941.
Lubbock	80	Nov. 21, 1941
Lufkin	43	Aug. 1, 1940
TEXAS—continued		
San Antonio	89	Mar. 14, 1942.
Seguin	18	Sept 10, 1941.
Sherman	53	Mar 25, 1941.
Texarkana	45	Feb 4, 1941.
UTAH		
Ogden	93	Sept 15, 1941.
Salt Lake City	96	Dec. 24, 1940.
VIRGINIA		
Abingdon	38	Mar. 21, 1941.
Bristol	80	December 1941.
Pulaski	99	Dec 18, 1941.
South Boston	75	May 29, 1941.
Waynesboro	98	Nov 15, 1941.
Williamsburg	55	May 26, 1941
WASHINGTON		
Camas	6	June 18, 1941.
Pullman	87	Aug. 26, 1941.
Vancouver	28	Nov. 28, 1940.
Walla Walla	61	May 28, 1941.
Yakima	72	May 14, 1941.
WYOMING		
Casper	67	Oct. 10, 1941.
Cheyenne	75	Dec. 24, 1941.

TABLE 3.—*Standard Milk Ordinance communities in which no market milk is pasteurized, but in which the raw market milk complies with the Grade A raw milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by raw milk ratings of 90 percent or more* [1]

[NOTE—All milk should be pasteurized or boiled, either commercially or at home, before it is consumed. See text for home method]

Community	Date of rating
ALABAMA	
Albertville	May 1, 1942.
Atmore	Apr 3, 1942
Boaz	May 1, 1942
Brewton	Apr 19, 1942.
Bridgeport	May 27, 1941.
Fort Payne	Mar. 25, 1942
Guntersville	May 1, 1942
Scottsboro	May 27, 1941.
Stevenson	Do.
KANSAS	
Horton	Mar. 30, 1942.
KENTUCKY	
Owenton	November 1941.
LOUISIANA	
Haynesville	Mar. 10, 1942.
NORTH CAROLINA	
Bladenboro	June 4, 1942
Clarkton	Do.
Elizabethtown	Do
Hemp	Apr 30, 1942.
Jackson	July 16, 1940.
Murfreesboro	July 17, 1940.
Rich Square	July 16, 1940
Scotland Neck	Do.
Weldon	Do.
Winton	July 17, 1940.
VIRGINIA	
Blackstone	May 29, 1941.
Boydton	Apr. 4, 1941.
Lawrenceville	Oct. 23, 1941.
WEST VIRGINIA	
Grantsville	May 12, 1941.

[1] Note particularly the percentage of milk pasteurized in the various communities listed in these tables. This percentage is an important factor to consider in estimating the safety of a city's milk supply.

DEATHS DURING WEEK ENDED AUGUST 1, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug 1, 1942	Corresponding week 1941
Data from 87 large cities of the United States.		
Total deaths	7,368	8,460
Average for 3 prior years	8,047	
Total deaths, first 30 weeks of year	254,751	258,612
Deaths per 1,000 population, first 30 weeks of year, annual rate	12.0	12.1
Deaths under 1 year of age	592	583
Average for 3 prior years	517	
Deaths under 1 year of age, first 30 weeks of year	16,767	15,640
Data from industrial insurance companies		
Policies in force	64,944,819	64,399,236
Number of death claims	10,672	10,739
Death claims per 1,000 policies in force, annual rate	8.6	8.7
Death claims per 1,000 policies, first 30 weeks of year, annual rate	9.5	9.9

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED AUGUST 8, 1942

Summary

The incidence of poliomyelitis declined during the week. A total of 128 cases was reported for the country as a whole, as compared with 145 cases for the preceding week and a 5-year (1937–41) median of 278 cases. The current incidence is below that for any prior year since 1938, when only 66 cases were reported for the corresponding week. Last year a total of 420 cases was reported for the same week. Only 2 States, Illinois, 22 (12 last week), and Tennessee, 19 (15 last week), reported more than 10 cases. The largest numbers of cases were reported in the geographic areas in which these 2 States are located.

A total of 64 cases of meningococcus meningitis was reported during the current week, as compared with 54 cases for the preceding week. The highest incidence is in the Middle Atlantic States, New York reporting 16 cases. Only 2 other States, Massachusetts (8) and California (6) reported more than 4 cases for the week. To date this year, 2,306 cases have been reported, a larger number than for the corresponding period of any other year since 1937, when 4,057 cases were reported for the same period.

Of the 9 common communicable diseases included in the following table, and for which weekly figures are available for earlier years, only meningococcus meningitis and influenza are above the 5-year median expectancy The incidence of influenza, however, is low. Only 2 cases of smallpox were reported for the current week, both in Missouri. The number of cases of typhoid fever decreased from 246 to 233, of which 150 cases occurred in the South Atlantic and South Central States.

A total of 41 cases of Rocky Mountain spotted fever was reported, the largest number for any week this year. Maryland reported 12 cases, Tennessee 5, and North Carolina 4. Only 2 cases occurred in the northwest Mountain States.

Other reports for the week include 1 case of anthrax (in Georgia), 26 cases of amebic dysentery (12 in Texas), 259 cases of bacillary dysentery (150 in Texas), 410 cases of unspecified dysentery (351 in Virginia), 22 cases of tularemia, and 115 cases of endemic typhus fever (41 in Texas, 34 in Georgia, 13 in South Carolina, and 12 in Florida).

The death rate (annual basis) for the current week for 88 large cities in the United States is 10.2 per 1,000 population, as compared with 10.4 for the preceding week. The 3-year (1939–41) average for the week is also 10.2. The accumulated rate to date this year is 11.9, as compared with 12.1 for the corresponding period last year.

Telegraphic morbidity reports from the State health officers for the week ended August 8, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported cases may have occurred

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Aug. 8, 1942	Aug. 9, 1941		Aug. 8, 1942	Aug. 9, 1941		Aug. 8, 1942	Aug. 9, 1941		Aug. 8, 1942	Aug. 9, 1941	
NEW ENG.												
Maine	0	0	0	----	----	----	27	12	16	2	0	0
New Hampshire	0	0	0	----	----	----	10	2	2	0	0	0
Vermont	0	0	0	----	----	----	32	14	13	0	0	0
Massachusetts	5	1	2		----	----	91	83	83	8	0	0
Rhode Island	1	1	0		----	----	11	2	4	0	0	0
Connecticut	0	1	1	2	----	----	18	34	18	0	1	0
MID. ATL.												
New York	6	13	15	----	[1] 1	[1] 1	176	208	234	16	7	7
New Jersey	1	1	2	----	2	2	49	66	66	2	1	0
Pennsylvania	5	8	17	----	----	----	39	156	118	4	2	2
E. NO. CEN.												
Ohio	8	3	6	8	3	3	46	77	77	0	2	1
Indiana	3	3	6		1	----	7	11	6	0	1	1
Illinois	11	15	15	4	2	2	19	40	40	2	0	1
Michigan [2]	3	1	5	10	----	----	37	88	88	2	0	0
Wisconsin	1	0	0	20	5	19	109	159	141	0	0	0
W. NO. CEN.												
Minnesota	0	3	2	1	----	----	13	9	14	0	0	0
Iowa	10	0	2	----	----	----	20	24	24	0	0	0
Missouri	4	1	1	7	1	1	8	23	2	3	0	0
North Dakota	0	3	3	----	5	2	2	5	1	0	0	0
South Dakota	0	5	0	----	----	----	12	8	1	2	0	0
Nebraska	0	0	1	3	----	----	3	10	2	0	0	0
Kansas	0	1	1	----	1	1	30	25	8	0	0	0
SO. ATL.												
Delaware	3	0	0	----	----	----	0	2	0	0	0	0
Maryland [2]	5	3	3	1	----	1	70	65	13	4	2	1
Dist. of Col.	2	1	1	1	----	----	2	11	5	1	0	0
Virginia	7	8	15	33	74	16	11	74	37	1	1	1
West Virginia	5	4	3	----	9	9	4	22	8	1	0	0
North Carolina	11	15	11	----	3	2	9	62	32	0	1	2
South Carolina	3	7	8	70	134	67	11	58	9	2	1	1
Georgia	9	15	16	5	16	5	6	59	6	0	0	0
Florida	3	1	2	4	4	1	6	9	4	0	0	0
E. SO. CEN.												
Kentucky	7	1	3	----	1	3	5	14	14	0	2	2
Tennessee	3	1	4	2	10	8	9	41	7	2	2	1
Alabama	4	11	11	9	16	15	10	8	8	0	1	2
Mississippi [3]	3	2	9	----	----	----	----	----	----	2	2	1
W. SO. CEN.												
Arkansas	5	6	5	3	15	5	7	32	3	1	0	0
Louisiana	3	1	5	3	----	7	5	2	2	0	1	0
Oklahoma	2	0	3	15	7	7	4	15	6	1	0	0
Texas	19	25	25	79	320	74	29	60	36	1	1	2
MOUNTAIN												
Montana	0	1	1	----	----	----	19	1	8	0	0	0
Idaho	1	0	0	----	----	----	46	0	4	0	0	0
Wyoming	0	3	1	5	----	----	13	5	3	0	2	0
Colorado	0	6	6	11	11	6	17	23	12	0	0	0
New Mexico	0	0	0	----	----	----	4	7	7	0	0	0
Arizona	0	0	1	14	18	10	23	5	5	0	1	0
Utah [3]	0	0	0	----	1	1	49	10	12	0	0	0
Nevada	0	0	----	2	----	----	16	5	----	0	0	----
PACIFIC												
Washington	[3] 4	0	1	----	----	----	157	1	11	0	0	0
Oregon	2	2	1	2	4	4	21	6	15	2	2	0
California	10	3	16	20	32	10	164	101	101	6	0	1
Total	169	176	272	334	696	326	1,476	1,749	1,539	65	33	33
31 weeks	[3] 7,084	7,155	11,399	80,025	488,728	159,159	464,760	821,401	347,041	2,307	1,361	1,361

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 8, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended		Median 1937–41	Week ended—		Median 1937–41
	Aug. 8, 1942	Aug. 9, 1941		Aug. 8, 1942	Aug. 9, 1941		Aug. 8, 1942	Aug. 9, 1941		Aug. 8, 1942	Aug. 9, 1941	
NEW ENG.												
Maine	1	0	0	8	0	2	0	0	0	1	0	1
New Hampshire	0	1	0	3	5	2	0	0	0	1	1	0
Vermont	0	1	0	3	1	1	0	0	0	0	0	0
Massachusetts	0	4	2	49	59	31	0	0	0	4	3	2
Rhode Island	0	0	0	2	3	2	0	0	0	0	0	0
Connecticut	2	1	1	11	6	6	0	0	0	3	0	3
MID. ATL.												
New York	5	30	13	58	61	65	0	0	0	6	30	18
New Jersey	7	13	3	19	19	19	0	0	0	2	4	7
Pennsylvania	3	17	3	51	41	59	0	0	0	8	28	21
E. NO. CEN.												
Ohio	9	27	16	49	50	50	0	0	0	8	10	21
Indiana	2	12	7	9	8	18	0	1	1	1	3	6
Illinois	22	8	5	41	35	53	0	1	1	5	16	18
Michigan [2]	7	10	14	32	35	52	0	0	0	3	2	4
Wisconsin	0	1	0	55	34	38	0	0	1	1	0	3
W. NO. CEN.												
Minnesota	1	12	4	19	9	25	0	0	1	0	1	3
Iowa	0	0	3	11	5	6	0	0	3	3	5	5
Missouri	4	0	1	14	12	13	2	1	0	13	9	14
North Dakota	0	0	0	4	0	3	0	0	0	0	1	1
South Dakota	0	0	1	16	6	6	0	1	2	0	1	1
Nebraska	3	0	1	1	5	4	0	0	1	0	0	0
Kansas	3	1	4	8	12	23	0	0	1	5	7	5
SO. ATL.												
Delaware	0	0	0	1	0	0	0	0	0	1	0	0
Maryland [2]	0	11	2	11	9	9	0	0	0	9	11	11
Dist. of Col.	0	2	0	7	3	1	0	0	0	0	0	0
Virginia	1	3	3	5	15	9	0	0	0	15	9	19
West Virginia	5	0	1	9	11	11	0	0	0	4	12	12
North Carolina	2	10	2	10	18	17	0	0	0	10	13	13
South Carolina	2	16	1	2	1	1	0	0	0	8	8	12
Georgia	1	71	5	10	6	7	0	0	0	6	27	28
Florida	1	13	1	0	2	4	0	0	0	2	6	4
E. SO. CEN.												
Kentucky	8	13	9	12	8	13	0	0	0	13	17	39
Tennessee	19	31	3	19	12	9	0	0	0	7	12	12
Alabama	2	80	1	11	14	11	0	0	0	3	13	19
Mississippi [2]	0	10	4	1	1	6	0	0	0	14	15	14
W. SO. CEN.												
Arkansas	6	3	3	4	2	3	0	0	0	8	15	30
Louisiana	1	2	2	6	0	5	0	0	0	10	8	14
Oklahoma	[4] 0	1	1	19	9	7	0	0	0	8	4	19
Texas	4	3	12	15	11	14	0	0	0	32	46	72
MOUNTAIN												
Montana	0	0	1	3	5	5	0	1	0	1	1	1
Idaho	0	0	0	0	1	2	0	0	0	0	0	0
Wyoming	0	0	0	7	0	3	0	0	0	0	0	1
Colorado	1	1	1	5	4	9	0	0	0	1	5	2
New Mexico	2	0	0	1	1	1	0	0	0	3	2	2
Arizona	1	0	0	2	5	0	0	0	0	2	2	1
Utah [2]	0	2	0	0	1	5	0	0	0	2	1	1
Nevada	0	0	------	0	0	------	0	0	------	0	0	------
PACIFIC												
Washington	0	3	1	8	8	8	0	0	0	[3] 0	0	2
Oregon	0	0	1	3	5	6	0	0	0	0	3	2
California	3	7	12	39	35	36	0	0	7	10	4	13
Total	128	420	278	673	593	751	2	5	34	233	355	497
31 weeks	[4] 1,149	2,235	1,638	87,954	88,639	115,033	604	1,138	7,847	[3] 3,624	4,119	6,096

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 8, 1942, and comparison with corresponding week of 1941—Continued

Division and State	Whooping cough, Week ended— Aug. 8, 1942	Whooping cough, Week ended— Aug. 9, 1941	Week ended Aug. 8, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	23	20	0	0	0	0	0	0	0	0	0
New Hampshire	7	0	0	0	0	0	0	0	0	0	0
Vermont	68	3	0	0	0	0	0	0	0	0	0
Massachusetts	208	171	0	0	0	0	0	0	0	0	0
Rhode Island	15	25	0	0	0	0	0	0	0	0	0
Connecticut	56	49	0	0	6	0	0	0	0	0	0
MID. ATL.											
New York	347	272	0	2	14	0	4	0	0	0	0
New Jersey	215	99	0	1	0	0	0	0	3	0	0
Pennsylvania	257	216	0	0	0	0	0	0	0	0	0
E. NO. CEN.											
Ohio	260	435	0	0	0	4	1	0	0	0	0
Indiana	46	21	0	0	0	0	0	0	1	0	0
Illinois	334	204	0	3	49	0	1	0	2	1	0
Michigan [2]	177	309	0	0	0	0	0	0	0	0	0
Wisconsin	242	233	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	67	58	0	2	0	0	0	0	0	0	0
Iowa	32	48	0	0	0	0	0	0	2	0	0
Missouri	11	9	0	0	0	0	1	0	1	1	0
North Dakota	11	2	0	0	0	0	0	0	0	0	0
South Dakota	0	4	0	0	0	0	0	0	0	0	0
Nebraska	6	13	0	0	0	0	0	0	0	0	0
Kansas	57	101	0	0	0	0	1	0	0	0	0
SO. ATL.											
Delaware	2	0	0	0	0	0	0	0	0	0	0
Maryland [2]	60	74	0	0	0	9	0	0	12	0	0
Dist. of Col.	24	21	0	0	0	0	0	0	0	0	0
Virginia	40	81	0	0	0	351	0	0	3	0	0
West Virginia	11	43	0	0	0	0	0	0	0	0	0
North Carolina	85	158	0	0	0	0	0	0	4	0	2
South Carolina	52	124	0	0	0	0	0	0	1	0	13
Georgia	13	37	1	0	8	0	0	0	0	1	34
Florida	8	19	0	0	1	0	0	0	0	1	12
E. SO. CEN.											
Kentucky	101	60	0	1	12	0	0	0	1	0	0
Tennessee	27	27	0	1	0	25	0	0	5	4	0
Alabama	7	4	0	0	0	0	0	0	1	0	11
Mississippi [2]	-	-	0	0	0	0	0	0	0	1	1
W. SO. CEN.											
Arkansas	8	4	0	1	3	0	0	0	0	2	0
Louisiana	2	15	0	3	6	0	0	1	1	0	1
Oklahoma	7	22	0	0	0	18	0	0	0	0	0
Texas	134	132	0	12	150	0	0	1	0	0	41
MOUNTAIN											
Montana	34	26	0	0	0	0	1	0	1	1	0
Idaho	7	46	0	0	0	0	0	0	0	0	0
Wyoming	4	10	0	0	0	0	0	0	1	5	0
Colorado	30	110	0	0	0	0	1	0	0	0	0
New Mexico	12	4	0	0	2	0	0	0	0	0	0
Arizona	12	14	0	0	0	21	0	0	0	0	0
Utah [2]	16	33	0	0	0	0	0	0	0	3	0
Nevada	13	4	0	0	0	0	0	0	1	1	0
PACIFIC											
Washington	64	81	0	0	0	0	4	0	0	0	0
Oregon	16	14	0	0	0	0	0	0	1	0	0
California	185	293	0	0	8	0	0	0	0	1	0
Total	3,413	3,748	1	26	259	428	14	2	41	22	115
31 weeks	116,280	139,971	-	-	-	-	-	-	-	-	-

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] A later report shows 10 cases of diphtheria and 1 case of typhoid fever in Washington for the week ended July 11, instead of 1 case of diphtheria and 0 cases of typhoid fever as previously reported.
[4] Delayed report, week ended Aug. 1, Oklahoma, 1 case.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 25, 1942

This table lists the reports from 90 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and typhoid fever
			Cases	Deaths							
Atlanta, Ga	0	0	7	0	0	0	1	0	0	0	
Baltimore, Md	5	0	1	0	9	3	11	0	6	0	
Barre, Vt	0	0		0	0	0	0	0	0	0	
Billings, Mont	0	0		0	7	0	0	0	0	0	
Birmingham, Ala	1	0		0	0	0	2	0	0	0	
Boise, Idaho	0	0		0	0	0	0	0	0	0	
Boston, Mass	6	0	1	0	40	0	6	3	19	0	
Bridgeport, Conn	0	0		0	1	0	0	0	1	0	
Brunswick, Ga	0	0		0	0	0	0	0	0	0	
Buffalo, N Y	0	0		0	4	3	4	0	3	0	
Camden, N J	1	0		0	0	0	0	0	0	0	
Charleston, S C	0	0		1	1	0	2	3	0	0	
Charleston, W Va	0	0		0	0	0	0	0	0	0	
Chicago, Ill	9	0		1	11	0	23	5	13	0	
Cincinnati, Ohio	1	0		0	1	0	7	0	11	0	
Cleveland, Ohio	0	0	7	0	7	0	2	0	1	0	
Columbus, Ohio	0	0		0	3	0	2	0	2	0	
Concord, N H	0	0		0	0	0	0	0	0	0	
Cumberland, Md	0	0		0	0	0	0	0	0	0	
Dallas, Tex	1	0		0	1	0	4	0	0	0	
Denver, Colo	1	0		0	16	0	4	0	2	0	
Detroit, Mich	1	0		0	15	0	7	1	21	0	
Duluth, Minn	0	0		0	3	0	0	0	2	0	
Fall River, Mass	1	0		0	1	0	0	0	2	0	
Fargo, N Dak	0	0		0	0	0	0	0	1	0	
Flint, Mich	0	0		0	0	0		0	1	1	
Fort Wayne, Ind	0	0		0	0	0		0	0	0	
Frederick, Md	0	0		0	0	0	0	0	0	0	
Galveston, Tex	0	0		0	0	0	1	0	0	0	
Grand Rapids, Mich	0	0		0	2	0	0	0	0	0	
Great Falls, Mont	0	0		0	0	0	1	0	0	0	
Hartford, Conn	0	0		0	10	0	0	0	0	0	
Helena, Mont	0	0		0	1	0	1	0	0	0	
Houston, Tex	3	0		0	1	0	7	0	1	0	
Indianapolis, Ind	2	0		0	8	0	6	2	0	0	
Kansas City, Mo	0	0		0	5	0	2	0	4	0	
Kenosha, Wis	0	0		0	4	0	0	0	0	0	
Little Rock, Ark	0	0		0	3	0	0	0	0	0	
Los Angeles, Calif	4	0	1	0	35	0	6	0	3	0	
Lynchburg, Va	0	0		0	1	0	2	0	0	0	
Memphis, Tenn	0	0		0	0	0	7	4	0	0	
Milwaukee, Wis	0	0	1	1	110	0	2	0	1	0	
Minneapolis, Minn	1	0		0	2	0	0	0	13	0	
Missoula, Mont	0	0		0	0	0	0	0	0	0	
Mobile, Ala	0	0	1	0	0	0	4	0	0	0	
Nashville, Tenn	0	0		0	5	0	3	1	3	0	
Newark, N J	0	0		0	25	0	7	0	[illegible]	0	
New Haven, Conn	0	0	1	0	3	0	1	0	0	0	
New Orleans, La	0	0	2	0	3	0	8	0	2	0	
New York, N Y	4	5	4	0	81	5	54	1	33	0	
Omaha, Nebr	0	0		0	2	0	3	0	1	0	
Philadelphia, Pa	0	0		0	15	2	21	0	15	0	
Pittsburgh, Pa	4	0		0	0	0	11	0	4	0	
Portland, Maine	0	0		0	9	2	1	0	0	0	
Providence, R I	0	0		0	33	0	1	0	0	0	

City reports for week ended July 25, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Pueblo, Colo	0	0	----	0	0	0	1	0	0	0	0	1
Racine, Wis	0	0	--	0	3	0	1	0	4	0	0	14
Raleigh, N C	0	0	--	0	0	0	2	0	0	0	0	3
Reading, Pa	0	0	--	0	0	1	0	0	0	0	0	12
Richmond, Va	0	0	--	0	4	0	6	0	0	0	0	1
Roanoke, Va	0	0		0	0	0	0	0	0	0	1	0
Rochester, N. Y	0	0	---	0	1	0	2	1	2	0	0	10
Sacramento, Calif	0	0	---	0	1	0	1	0	7	0	0	3
Saint Joseph, Mo	0	0		0	0	0	4	0	0	0	0	0
Saint Louis, Mo	0	0	1	0	7	0	4	2	4	1	0	17
Saint Paul, Minn	0	0	--	0	7	0	0	0	5	0	0	15
Salt Lake City, Utah	0	0		0	40	0	0	0	2	0	0	8
San Antonio, Tex	0	0	2	1	1	0	2	0	1	0	0	0
San Francisco, Calif	0	0	---	0	51	1	6	0	3	0	0	6
Savannah, Ga	0	0	-----	1	0	0	1	0	1	0	0	1
Seattle, Wash	1	0	---	1	56	0	4	0	0	0	0	10
Shreveport, La	2	0	---	0	0	0	2	1	1	0	3	0
South Bend, Ind	0	0	---	0	0	0	0	0	0	0	0	8
Spokane, Wash	0	0	---	0	22	0	1	0	0	0	0	12
Springfield, Ill	0	0	---	0	1	0	0	0	0	0	1	3
Springfield, Mass	0	0	-----	0	6	0	1	0	4	0	0	3
Superior, Wis	0	0	------	0	1	0	0	0	0	0	0	2
Syracuse, N. Y	0	0	-----	0	88	1	1	0	1	0	2	46
Tacoma, Wash	0	0	-----	0	8	0	1	0	1	0	0	3
Tampa, Fla	0	0	------	0	2	0	4	0	0	0	0	4
Terre Haute, Ind	0	0	----	0	0	0	1	0	0	0	0	0
Topeka, Kans	0	0	--	0	1	0	0	0	0	0	0	2
Trenton, N. J	0	0	1	0	0	0	3	0	1	0	0	2
Washington, D C	0	0	-----	0	8	0	13	0	7	0	0	21
Wheeling, W Va	0	0	------	0	4	1	0	0	2	0	0	9
Wichita, Kans	0	0	------	0	7	0	0	0	1	0	0	5
Wilmington, Del	0	0	----	0	1	0	2	0	2	0	0	1
Wilmington, N C	0	0	-----	0	0	0	4	0	0	0	0	16
Winston-Salem, N. C	0	0	-----	0	0	0	2	0	0	0	1	3
Worcester, Mass	0	0	-----	0	1	0	4	0	6	0	0	40

Dysentery, amebic.—Cases: Detroit, 2, Los Angeles, 1; New York, 4, Wichita, 1.

Dysentery, bacillary.—Cases. Atlanta, 1, Baltimore, 3, Nashville, 5, New York, 2; Philadelphia, 1; Richmond, 3; St. Louis, 1.

Rocky Mountain spotted fever.—Cases Cincinnati, 1; Nashville, 1.

Typhus fever.—Cases Charleston, S C., 1, Galveston, 1; New Orleans, 3; New York, 1 , San Antonio, 1; Savannah, 1.

Rates (annual basis) per 100,000 population, for the group of 90 cities in the preceding table (estimated population, 1942, 34,134,198)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended July 25, 1942	7.33	4.58	0.92	114 42	45.52	34 52	0 31	5.35	219 82
Average for week, 1937–41	10.19	4 17	1.54	[1] 140 18	39 99	45.54	0 46	7.26	213.98

[1] Median.

PLAGUE INFECTION IN CALIFORNIA AND NEVADA

Plague infection has been reported in specimens collected in California and Nevada as follows: [1]

CALIFORNIA

Monterey County: June 26, in a pool of 103 fleas from 20 ground squirrels, *C. beecheyi*, taken in the northern part of the Fort Ord Military Reservation.

San Bernardino County: In pools of fleas as follows: April 6, 17 fleas from 6 desert antelope squirrels, *Ammospermophilus leucurus*, taken on the Helendale Airport, 14 miles northeast of Helendale; April 14, 12 fleas from 7 squirrels, same species, taken 25 miles northwest of Needles; and May 15, 14 fleas from 12 wood rats, *Neotoma*, sp., taken at the Fawnskin Resort, 4 miles northwest of Big Bear Lake.

San Diego County: May 4, in a pool of 154 fleas from 8 ground squirrels, *C. fisheri*, taken on the premises of the Scripps Institute at La Jolla.

San Luis Obispo County: In pools of fleas from ground squirrels, *C. beecheyi*, as follows: May 27, 187 fleas from 17 squirrels taken on the Newhall Land and Farming Co. property, 8 miles northeast of Santa Maria (Alamo Creek), and June 9, 158 fleas from 3 squirrels taken 12 miles southeast of Arroyo Grande.

Santa Barbara County: June 11, in a pool of 91 fleas from 5 ground squirrels, *C. beecheyi*, taken in the Santa Barbara County Pioneer Park, 12 miles northeast of Santa Maria.

Santa Clara County: In pools of fleas from ground squirrels, *C. beecheyi*, as follows: April 7, 180 fleas from 14 squirrels taken 1 mile north of Calero Dam; April 8, 49 fleas from 5 squirrels taken 5 miles west of Morgan Hill, and 201 fleas from 14 squirrels taken 3 miles southwest of Morgan Hill; April 9, 14 fleas from 16 squirrels taken 2½ miles northwest of Gilroy; April 10, 200 fleas from 14 squirrels taken ½ mile north of Calero Dam.

NEVADA

Washoe County: July 10, in a pool of tissue from 32 ground squirrels, *C. townsendii*, taken 21 miles southeast of Doyle, Calif.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—Rats proved positive for plague have been reported in Hawaii Territory as follows: Week ended June 26, 1942, 2 rats in Hamakua, Paauhau area, Hamakua District, Island of Hawaii; week ended July 18, 1942, 1 rat in Honokaa, Paauhau area, Hamakua District, Island of Hawaii.

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[1] Dates are those on which the specimens were collected.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended July 11, 1942.—During the week ended July 11, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	1		1	2	3				1	8
Chickenpox		1		65	138	19	25	13	42	303
Diphtheria		6		18	1	1		2	2	30
Dysentery				35						35
German measles		3		2	26	2	2		4	39
Influenza		5			3				4	12
Measles		1	1	80	210	36	7	8	5	348
Mumps		10		49	179	24	51	5	167	485
Pneumonia	4	3			7	1			4	19
Poliomyelitis		2	2			2				6
Scarlet fever		9	18	35	90	14	10	44	18	238
Smallpox							1	1		2
Tuberculosis		9	17	52	40	[1] 97	37	3	42	297
Typhoid and paratyphoid fever			1	23	1		1	1	1	28
Undulant fever				1	2					3
Whooping cough		4	2	185	50	4	2		18	265
Other communicable diseases	2	6			238	43		1	7	297

[1] For 4 weeks ended July 15, 1942.

Vital statistics—Year 1941.—There were 22.3 live births per 1,000 population during the year 1941. The death rate was 10.0 per 1,000 population. The infant mortality rate was 60 per 1,000 live births, while the maternal death rate was 3.5 per 1,000 live births.

The accompanying tables give the number of births, deaths, and marriages by Provinces, for 1941 and deaths by causes and Provinces for 1941:

Number of births, deaths, and marriages, year 1941

Province	Live births	Deaths (exclusive of stillbirths)	Deaths under 1 year of age	Maternal deaths	Marriages
Canada [1]	253,991	114,216	15,168	891	121,781
Prince Edward Island	2,018	1,125	162	6	671
Nova Scotia	13,623	6,815	894	45	6,575
New Brunswick	12,229	5,166	931	42	4,938
Quebec	88,544	34,250	6,749	382	32,763
Ontario	72,177	39,179	3,290	219	43,276
Manitoba	14,812	6,495	788	46	8,305
Saskatchewan	18,451	6,458	946	58	7,033
Alberta	17,190	6,247	859	53	8,467
British Columbia	14,947	8,481	549	40	9,753

[1] Exclusive of Yukon and the Northwest Territories

Deaths by cause and Province, year 1941

Cause of death	Canada [1]	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
All causes	114, 216	1, 125	6, 815	5, 166	34, 250	39, 179	6, 495	6, 458	6, 247	8, 481
Cancer and other malignant tumors	13, 362	108	780	479	3, 508	4, 929	963	814	687	1, 194
Diarrhea and enteritis	2, 314	6	78	97	1, 368	411	104	115	97	38
Diphtheria	240	5	53	7	134	14	7	12	6	2
Diseases of the heart	26, 533	213	1, 348	962	5, 706	11, 667	1, 467	1, 416	1, 378	2, 376
Diseases of the arteries	2, 264	28	140	120	498	944	200	101	85	148
Homicides	125	1	11	2	30	39	8	5	14	15
Influenza	2, 399	28	154	120	1, 016	465	106	219	174	117
Measles	324	6	65	49	81	43	10	30	30	10
Motor vehicle accidents	1, 843	8	102	89	482	834	79	46	77	126
Nephritis	7, 378	89	381	250	3, 446	2, 006	266	321	248	371
Pneumonia	5 931	80	458	441	1, 875	1, 674	334	350	369	350
Poliomyelitis	66	-	4	19	3	10	20	3	6	1
Puerperal causes	801	6	45	42	382	219	46	58	53	40
Scarlet fever	115	1	9	2	44	38	6	7	6	2
Suicides	891	4	38	31	139	314	65	83	102	115
Tuberculosis	6, 039	70	423	314	2, 678	1, 097	328	286	319	524
Typhoid and paratyphoid fever	165		2	16	103	23	1	12	5	3
Other violent deaths	5, 535	44	353	187	1, 220	2, 104	336	329	425	537
Other specified causes	27, 631	274	1, 603	1, 264	9, 180	8, 220	1, 682	1, 723	1, 591	1, 824
Unspecified causes	1, 000	53	144	256	257	100	56	38	58	40
Whooping cough	436	7	15	20	234	100	9	20	23	8

[1] Exclusive of Yukon and the Northwest Territories

CHILE

Antofagasta Province—Cerebrospinal meningitis.—For the period January 1 to July 15, 1942, a total of 86 cases of cerebrospinal meningitis with 18 deaths were reported in Antofagasta Province, Chile.

JAMAICA

Communicable diseases—4 weeks ended July 4, 1942.—During the 4 weeks ended July 4, 1942, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	8	9	Puerperal fever	----	2
Diphtheria	2	3	Tuberculosis	33	80
Dysentery	-	2	Typhoid fever	6	39
Erysipelas	--	2	Typhus fever	2	2
Leprosy	--------	1			

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Typhus Fever

Morocco.—Typhus fever has been reported in Morocco as follows: Week ended July 4, 1942, 693 cases; week ended July 18, 1942, 394 cases.

Rumania.—During the week ended July 25, 1942, 11 cases of typhus fever were reported in Rumania.

Tunisia.—For the period July 1–10, 1942, 411 cases of typhus fever were reported in Tunisia.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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Public Health Reports

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DISTRIBUTION OF HEALTH SERVICES IN THE STRUCTURE OF STATE GOVERNMENT

CHAPTER VI—MEDICAL AND DENTAL CARE BY STATE AGENCIES—Continued*

By JOSEPH W. MOUNTIN, *Assistant Surgeon General*, and EVELYN FLOOK, *United States Public Health Service*

Programs of medical care which, for expediency, have been categorized as general and allied special include those offering treatment for either acute or chronic illnesses, irrespective of whether general or highly specialized medical or surgical care may be involved. The chief distinction between programs of medical care described as "general" and those listed as "allied special" is that each of the illnesses[4] of the latter group is sufficiently prevalent or sufficiently serious to have aroused attention to itself as a particular problem demanding intensified action. Because of the inherent relationship between medical care classified as "general" and that termed "allied special" it seems appropriate to present first, certain broad information pertinent to the combined programs, and later, a more detailed breakdown designed to separate the facts applicable to general medical care from those which especially pertain to the several allied special conditions.

The various State agencies which participate in providing for the medically indigent any medical care classified as general or allied special are identified in table 3. From this tabulation may be obtained an over-all view of the differences which exist among the States from the standpoint of variation in types of agencies responsible for some portion of the State medical care scheme, and of the dispersion or concentration of responsibility. Association of the separate organizations and the identical conditions with which each is concerned is reserved for table 4. This latter table is constructed to portray a State-by-State picture of the exact function of each agency with respect to discrete problems of medical care and definitive measures

* The first section of this chapter, Psychiatric Services, was published in the PUBLIC HEALTH REPORTS 57: 1195-1209 (August 14, 1942).

[4] Allied special conditions include crippling conditions of children, cancer, pneumonia, and eye disorders.

for affording service The discussion which follows will amplify entries appearing in both tables

TABLE 3.—*Official State agencies participating in medical care for general and/or allied special* conditions in each State and Territory, the District of Columbia, and the Virgin Islands***

State or Territory	Department of State government								
	Health	Welfare, social security, or public assistance	Education	Special board or commission	Board of control, department of State institutions, hospital commission	Independent State hospital	State university or college	State legislature	Other
Alabama	X	X	X				X		X
Arizona	X	X							
Arkansas	X	X					X		
California	X	X					X		
Colorado	X	X					X		
Connecticut	X	X		X				X	
Delaware	X								
District of Columbia	X		X	X					
Florida	X		X	X					
Georgia	X	X	X						
Idaho [a]	X								
Illinois	X	X		X			X	X	X
Indiana	X	X	X				X		
Iowa	X	X	X	X [b]			X		X
Kansas	X	X		X			X		
Kentucky	X		X	X					
Louisiana	X	X	X			X [c]	X	X	
Maine [a]	X	X							
Maryland	X	X				X	X	X	
Massachusetts	X	X	X						
Michigan	X	X		X [b]			X		
Minnesota	X	X	X				X		
Mississippi	X	X	X	X	X [b]				
Missouri	X		X	X			X		
Montana	X	X	X						
Nebraska	X			X	X				
Nevada	X								
New Hampshire	X	X	X	X					
New Jersey	X	X		X					X
New Mexico	X	X				X		X	
New York	X	X	X						
North Carolina	X		X	X		X			
North Dakota	X	X		X					
Ohio	X	X	X	X			X		X
Oklahoma	X	X		X	X		X		
Oregon	X	X					X		X
Pennsylvania	X	X	X						
Rhode Island	X	X	X						X
South Carolina	X		X						
South Dakota	X	X	X						
Tennessee	X	X	X						
Texas	X	X	X				X		
Utah	X	X		X					
Vermont	X	X		X			X		
Virginia	X	X	X	X			X [b]		
Washington	X	X							
West Virginia	X	X [b]	X		X				
Wisconsin	X	X	X	X			X		
Wyoming	X		X						
Alaska	X	X							
Hawaii	X	X	X						
Puerto Rico	X								
Virgin Islands	X								

*Allied special conditions include crippling conditions of children, cancer, pneumonia, and eye disorders.

**Any differences between information presented in this table and corresponding entries in table 1 (h I of this series are the result of combining several activities originally shown separately, or of further refinement of the data since publication of the initial article.

[a] The department of health is really a division (Idaho) and bureau (Maine) of public health subordinate to the department of welfare (Idaho) and the department of health and welfare (Maine).

[b] Two separate agencies of this classification participate in some form of general or allied special medical care.

[c] Three separate agencies of this classification participate in some form of general or allied special medical care.

TABLE 4.—*Department of State government* responsible for specific activities in providing medical care for general and allied special** conditions of the needy in each State and Territory, the District of Columbia, and the Virgin Islands.*

Activity	State or Territory							
	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia
GENERAL MEDICAL CARE OF THE NEEDY:								
Promotes local programs of medical care	2							
Supervises and/or provides consultation service to local organizations	2		2	2	2			
Distributes and/or administers financial grants-in-aid:								
For general home and office care—								
Through general relief funds to local units					2	2		
Through specific funds to local units	2							
For general hospital care—								
Through general relief funds to local units					2	2		
Through specific funds to local units	2							
Through subsidy to or contract with local hospitals			2			8		1
Operates a direct service program								
Furnishes or directly finances home and office care	2[e]							1
Provides general clinic service for ambulatory patients			7	7	7			1
Operates general hospitals			7	7	7			1
Provides free ambulance service								1
Maintains special facilities for medical care of migratory laborers				1, 2				
Includes medical examination, physical restoration, and/or provision of artificial appliances in vocational rehabilitation services	3							4
Renders additional service not covered in this classification			2	2				1
SERVICES FOR CRIPPLED CHILDREN:								
Conducts promotional and/or educational programs regarding prevention and treatment of crippling conditions	3	2	2	1	1	1	1	1
Supervises and/or provides consultation service to local organizations	3		2	1	1		1	
Distributes and/or administers financial grants-in-aid.								
For local crippled children's clinics				1		2[g]		
For hospital care: Through subsidy to local hospitals or contract with local hospitals on a per diem or individual case basis	3	2	2	1	1	1, 2		1
For convalescent home care	3		2	1	1	1		
Operates a direct service program:								
Operates diagnostic clinics	3	2	2	1	1, 7	1	1	1
Operates treatment clinics	3	2		1		1		1
Provides nursing service for case-finding and follow-up	1	2		1	1	1	1	1
Provides braces and other orthopedic appliances	3	2	2	1	1[f]	1		1
Operates crippled children's hospitals or general hospitals which accept crippled children on free or part-pay basis					7			1
Provides post-hospital treatment (physical therapy)	3	2	2	1	1	1		1
Renders additional service not covered in this classification								
CANCER SERVICE:								
Requires cancer morbidity reporting by law or regulation			1				1	
Conducts or participates in educational programs for early diagnosis	1		1		1	1		
Distributes and/or administers financial grants-in-aid:								
For local cancer clinics								
For hospitalization of cancer patients								

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities in providing medical care for general and allied special conditions of the needy in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued.

Activity	State or Territory							
	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia
CANCER SERVICE—Continued.								
Operates a direct service program:								
Operates cancer diagnostic clinics			7		7			
Operates cancer treatment clinics			7					
Provides free tissue diagnostic service	7[f]		1, 7		7[j]			
Operates cancer hospitals or general hospitals which accept cancer patients on a free or part-pay basis			7		7			
Engages in cancer research and/or special studies						1		
PNEUMONIA SERVICE:								
Trains physicians and/or laboratory technicians in pneumonia work					1	1		1
Does pneumococcus typing	1				1	1	1[g]	1
Makes chemical blood determinations (sulfonamides)								1
Distributes free diagnostic serum					1	1	1[f]	
Distributes free therapeutic serum					1		1	1
Distributes free drugs for treatment of pneumonia					1		1[f]	1
PREVENTION AND CARE OF BLINDNESS:								
Promulgates and/or enforces State laws, rules, and regulations concerning routine use of prophylactic in eyes of newborn	1	1	1	1[k]	1	1	1	1
Distributes silver nitrate free of charge for prevention of ophthalmia neonatorum	1		1	1	1	1	1	1
Operates refraction clinics	9[j]				1, 7			
Operates trachoma clinics			1, 2					
Finances individual ophthalmological examinations or eye treatment service for the needy			2			4		
Hospitalizes at State expense indigent patients needing eye operations or treatment (including trachoma cases)	2[i], 9[j]		2		1, 2 7	4		1
Makes special studies to determine causes of blindness						4		
Operates or subsidizes sight-saving classes						3		1, 3

Activity	State or Territory							
	Florida	Georgia	Idaho [a]	Illinois	Indiana	Iowa	Kansas	Kentucky
GENERAL MEDICAL CARE OF THE NEEDY:								
Promotes local programs of medical care				2	2[b]		2	
Supervises and/or provides consultation service to local organizations					2[b]	2	2	
Distributes and/or administers financial grants-in-aid:								
For general home and office care—								
Through general relief funds to local units				2	2[b]	2	2	
Through specific funds to local units								
For general hospital care—								
Through general relief funds to local units				2			2	
Through specific funds to local units								
Through subsidy to or contract with local hospitals								
Operates a direct service program:								
Furnishes or directly finances home and office care						2[e]		

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities in providing medical care for general and allied special conditions of the needy in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Florida	Georgia	Idaho [a]	Illinois	Indiana	Iowa	Kansas	Kentucky
GENERAL MEDICAL CARE OF THE NEEDY—Continued.								
Operates a direct service program—Continued.								
Provides general clinic service for ambulatory patients	------	------	------	2[d], 7[d]	7	7	7	------
Operates general hospitals	------	------	------	2[d], 7[d]	7	7	7	------
Provides free ambulance service	------	------	------	------	------	7	------	------
Maintains special facilities for medical care of migratory laborers	------	------	------	------	------	------	------	------
Includes medical examination, physical restoration, and/or provision of artificial appliances in vocational rehabilitation services	3	------	------	9	------	4	2	------
Renders additional service not covered in this classification	------	----	------	------	------	2	------	------
SERVICES FOR CRIPPLED CHILDREN:								
Conducts promotional and/or educational programs regarding prevention and treatment of crippling conditions	4	1, 2, 3	1	2, 4	2	3	------	4
Supervises and/or provides consultation service to local organizations	4	2, 3	1	2[f], 4[f]	2	------	4	4
Distributes and/or administers financial grants-in-aid:								
For local crippled children's clinics	------	------	------	2	------	------	4	------
For hospital care: Through subsidy to local hospitals or contract with local hospitals on a per diem or individual case basis	4	2	1	2	2	------	4	4
For convalescent home care	------	2	1	2	------	3	------	------
Operates a direct service program:								
Operates diagnostic clinics	4	2	1	2	2, 7	3, 7	4	4
Operates treatment clinics	4	------	1	------	2, 7	3, 7	4	------
Provides nursing service for case-finding and follow-up	4	2	1	2	2	3	4	4
Provides braces and other orthopedic appliances	4	2	1	2	7	3	4	4
Operates crippled children's hospitals or general hospitals which accept crippled children on free or part-pay basis	----	-- --	- --	2, 7	7	7	7	------
Provides post-hospital treatment (physical therapy)	4	2	1	2	7	7	7	4
Renders additional service not covered in this classification	3	--- --	------	9	3	9	------	------
CANCER SERVICE:								
Requires cancer morbidity reporting by law or regulation	1	------	------	------	------	------	1	------
Conducts or participates in educational programs for early diagnosis	------	1	1	------	1	1	1	------
Distributes and/or administers financial grants-in-aid:								
For local cancer clinics	------	1	------	------	------	1	------	------
For hospitalization of cancer patients	------	1	------	------	------	------	------	------
Operates a direct service program:								
Operates cancer diagnostic clinics	------	------	------	------	------	7	7	------
Operates cancer treatment clinics	------	------	------	------	------	7	7	------
Provides free tissue diagnostic service	------	1	------	------	1, 7	------	------	------
Operates cancer hospitals or general hospitals which accept cancer patients on a free or part-pay basis	------	------	------	------	----	7	7	------
Engages in cancer research and/or special studies	------	1	------	------	7	------	------	------
PNEUMONIA SERVICE:								
Trains physicians and/or laboratory technicians in pneumonia work	------	------	1	1	1	1	------	------
Does pneumococcus typing	------	1	1	1	1	------	1	1[f]
Makes chemical blood determinations (sulfonamides)	------	------	------	1	------	------	1	------
Distributes free diagnostic serum	------	1	------	1[f]	------	1	1	------
Distributes free therapeutic serum	------	------	------	1	1	1	------	------
Distributes free drugs for treatment of pneumonia	------	------	------	1	------	1[f]	1	------

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities in providing medical care for general and allied special conditions of the needy in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia
PREVENTION AND CARE OF BLINDNESS:								
Promulgates and/or enforces State laws, rules, and regulations concerning routine use of prophylactic in eyes of newborn	1[k]	1	1	1	---	1	1	1
Distributes silver nitrate free of charge for prevention of ophthalmia neonatorum	1	1	---	1	1	1	1	1
Operates refraction clinics	---	---	---	2	---	7	---	---
Operates trachoma clinics	---	---	---	2	---	---	---	1
Finances individual ophthalmological examinations or eye treatment service for the needy	---	---	---	---	2	2, 4[f]	2	---
Hospitalizes at State expense indigent patients needing eye operations or treatment (including trachoma cases)	---	---	---	2	2	2, 7	2	1
Makes special studies to determine causes of blindness	---	---	---	---	2	2	2	---
Operates or subsidizes sight-saving classes	---	---	---	8	2	---	2	3

Activity	Louisiana	Maine[a]	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri
GENERAL MEDICAL CARE OF THE NEEDY:								
Promotes local programs of medical care		---	2	---	2	2	---	---
Supervises and/or provides consultation service to local organizations	---	---	2	2	2	2	---	---
Distributes and/or administers financial grants-in-aid								
For general home and office care—								
Through general relief funds to local units	2	2	2	2	2	2	---	---
Through specific funds to local units	---	---	---	---	---	---	---	---
For general hospital care—								
Through general relief funds to local units	---	---	2	---	---	---	---	---
Through specific funds to local units	---	---	---	---	---	---	---	---
Through subsidy to or contract with local hospitals	6, 8	2	8	---	---	2[c]	5	---
Operates a direct service program								
Furnishes or directly finances home and office care	---	---	---	---	---	2[e]	---	---
Provides general clinic service for ambulatory patients	6[e]	---	7	2	7	7	5	---
Operates general hospitals	6[e]	---	6, 7	2	7	7	5	---
Provides free ambulance service	6[e]	---		---	---	---	---	---
Maintains special facilities for medical care of migratory laborers	---	---	---	---	---	1, 2	---	---
Includes medical examination, physical restoration, and/or provision of artificial appliances in vocational rehabilitation services	3	---	---	---	4	3	4	3
Renders additional service not covered in this classification	---	---	---	1	---	---	---	---
SERVICES FOR CRIPPLED CHILDREN:								
Conducts promotional and/or educational programs regarding prevention and treatment of crippling conditions	1	1	1	---	4	---	3	---
Supervises and/or provides consultation service to local organizations	1	1	1	---	4	2	3	---

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities in providing medical care for general and allied special conditions of the needy in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Louisiana	Maine [a]	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri
SERVICES FOR CRIPPLED CHILDREN—Con.								
Distributes and/or administers financial grants-in-aid:								
For local crippled children's clinics					4			
For hospital care: Through subsidy to local hospitals or contract with local hospitals on a per diem or individual case basis	1	2	1	1	4	2	3	7
For convalescent home care		1		1			3	7
Operates a direct service program:								
Operates diagnostic clinics	1, 6	1	1	1	4	2, 7	3	7
Operates treatment clinics	6	1	1		4	7	3	7
Provides nursing service for case-finding and follow-up	1	1		1	4	2	3	7
Provides braces and other orthopedic appliances	1	1	1	1	4	2	3	7
Operates crippled children's hospitals or general hospitals which accept crippled children on free or part-pay basis	6			2		2, 7		
Provides post-hospital treatment (physical therapy)	1, 6			1	4	2, 7	3	7
Renders additional service not covered in this classification				3				
CANCER SERVICE:								
Requires cancer morbidity reporting by law or regulation	1						1	
Conducts or participates in educational programs for early diagnosis	1			1	1	1	1	1, 4
Distributes and/or administers financial grants-in-aid:								
For local cancer clinics				1				
For hospitalization of cancer patients								
Operates a direct service program:								
Operates cancer diagnostic clinics	6[b]			1		7		4
Operates cancer treatment clinics	6[b]			1		7		4
Provides free tissue diagnostic service	1, 6[b]			1	1, 7	7[j]		4[j]
Operates cancer hospitals or general hospitals which accept cancer patients on a free or part-pay basis	6[e]			1		7		4
Engages in cancer research and/or special studies				1		7		4
PNEUMONIA SERVICE:								
Trains physicians and/or laboratory technicians in pneumonia work	1, 7		1	1	1			1
Does pneumococcus typing	1	1	1	1	1	1	1	1
Makes chemical blood determinations (sulfonamides)	1							
Distributes free diagnostic serum	1	1		1	1		1	1
Distributes free therapeutic serum	1	1	1	1	1	1	1	1
Distributes free drugs for treatment of pneumonia	1		1			1	1	1
PREVENTION AND CARE OF BLINDNESS:								
Promulgates and/or enforces State laws, rules, and regulations concerning routine use of prophylactic in eyes of newborn	1	1	1[k]	1[k]	1	1	1	1
Distributes silver nitrate free of charge for prevention of ophthalmia neonatorum	1	1	1	1	1	1	1	1
Operates refraction clinics	6[e]					7		
Operates trachoma clinics								1
Finances individual ophthalmological examinations or eye treatment service for the needy								
Hospitalizes at State expense indigent patients needing eye operations or treatment (including trachoma cases)	6[e]	2[l]		2	2[l]	2, 7	2	1
Makes special studies to determine causes of blindness				2	2			
Operates or subsidizes sight-saving classes				3		3		

See footnotes at end of table.

Table 4.—*Department of State government responsible for specific activities in providing medical care for general and allied special conditions of the needy in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina
GENERAL MEDICAL CARE OF THE NEEDY:								
Promotes local programs of medical care				2	2	2	2	
Supervises and/or provides consultation service to local organizations	2			2	2	2	2	
Distributes and/or administers financial grants-in-aid:								
For general home and office care—								
Through general relief funds to local units	2					2	2	
Through specific funds to local units				2°	2			
For general hospital care—								
Through general relief funds to local units	2					2	2	
Through specific funds to local units				2°	2		1	
Through subsidy to or contract with local hospitals						8	1	
Operates a direct service program:								
Furnishes or directly finances home and office care								
Provides general clinic service for ambulatory patients								
Operates general hospitals						6		
Provides free ambulance service								
Maintains special facilities for medical care of migratory laborers					1			
Includes medical examination, physical restoration, and/or provision of artificial appliances in vocational rehabilitation services	3	4		3	9			3
Renders additional service not covered in this classification					2		1	
SERVICES FOR CRIPPLED CHILDREN								
Conducts promotional and/or educational programs regarding prevention and treatment of crippling conditions		5	1	1	4	2	1	1
Supervises and/or provides consultation service to local organizations	2	5	1	1	4	2	1	1
Distributes and/or administers financial grants-in-aid:								
For local crippled children's clinics								
For hospital care: Through subsidy to local hospitals or contract with local hospitals on a per diem or individual case basis	2	5	1	1	4		3	1
For convalescent home care	2	5	1		4			1
Operates a direct service program:								
Operates diagnostic clinics	2	5	1	1	4	2	1	1, 6
Operates treatment clinics		5	1	1		2	1	1, 6
Provides nursing service for case-finding and follow-up	2	5	1	1	4	2	1	1
Provides braces and other orthopedic appliances	2	5	1	1	4	2	1	1, 6
Operates crippled children's hospitals or general hospitals which accept crippled children on free or part-pay basis		5				2	1	6
Provides post-hospital treatment (physical therapy)	2	5		1	4	2	1	1, 6
Renders additional service not covered in this classification				3				
CANCER SERVICE.								
Requires cancer morbidity reporting by law or regulation	1			1		1	1	
Conducts or participates in educational programs for early diagnosis	1			4	1		1	
Distributes and/or administers financial grants-in-aid.								
For local cancer clinics							1	
For hospitalization of cancer patients				4				

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities in providing medical care for general and allied special conditions of the needy in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina
CANCER SERVICE—Continued.								
Operates a direct service program:								
Operates cancer diagnostic clinics				4			1	
Operates cancer treatment clinics				4			1	
Provides free tissue diagnostic service				4			1	
Operates cancer hospitals or general hospitals which accept cancer patients on a free or part-pay basis							1	
Engages in cancer research and/or special studies	1				1		1	
PNEUMONIA SERVICE:								
Trains physicians and/or laboratory technicians in pneumonia work	1			1	1		1	
Does pneumococcus typing	1[f]			1	1	1	1	
Makes chemical blood determinations (sulfonamides)						1	1	
Distributes free diagnostic serum				1	1	1	1	
Distributes free therapeutic serum				1	1		1	
Distributes free drugs for treatment of pneumonia						1		
PREVENTION AND CARE OF BLINDNESS:								
Promulgates and/or enforces State laws, rules, and regulations concerning routine use of prophylactic in eyes of newborn		1	1	1		1	1	1
Distributes silver nitrate free of charge for prevention of ophthalmia neonatorum	1		1	1	1	1		1
Operates refraction clinics								4
Operates trachoma clinics								
Finances individual ophthalmological examination or eye treatment service for the needy	2	5[g]		2			2	4
Hospitalizes at State expense indigent patients needing eye operations or treatment (including trachoma cases)	2	5[g]		2		2[i]		4
Makes special studies to determine causes of blindness	2			2	1		2	4
Operates or subsidizes sight-saving classes							3	3, 4

Activity	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota
GENERAL MEDICAL CARE OF THE NEEDY.								
Promotes local programs of medical care	2	2		2		2		
Supervises and/or provides consultation service to local organizations	2	2		2		2		
Distributes and/or administers financial grants-in-aid:								
For general home and office care—								
Through general relief funds to local units	2	2		2		2		
Through specific funds to local units								
For general hospital care—								
Through general relief funds to local units	2	2		2		2		
Through specific funds to local units								
Through subsidy to or contract with local hospitals		2[c], 9[c]			2			
Operates a direct service program:								
Furnishes or directly finances home and office care	2[c]	2[c]			2	2[c]		2[c]
Provides general clinic service for ambulatory patients		2[c], 7			2	2		

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities in providing medical care for general and allied special conditions of the needy in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota
	State or Territory							
GENERAL MEDICAL CARE OF THE NEEDY—Continued.								
Operates a direct service program—Continued								
Operates general hospitals	----	7	--	----	2	2	---	------
Provides free ambulance service	----		----	----	- -	---	-----	------
Maintains special facilities for medical care of migratory laborers	----		- -	-	- --	-----	---	------
Includes medical examination, physical restoration, and/or provision of artificial appliances in vocational rehabilitation services	4	---	---	-----	3	3	3	3[c]
Renders additional service not covered in this classification	----	2	----	- -	2	--	-----	-----
SERVICES FOR CRIPPLED CHILDREN:								
Conducts promotional and/or educational programs regarding prevention and treatment of crippling conditions	2		-----	2	---	-	1	1
Supervises and/or provides consultation service to local organizations	2	--	-----	--	-----	[illegible]	1	1
Distributes and/or administers financial grants-in-aid								
For local crippled children's clinics	--	1	-----	----	---			------
For hospital care Through subsidy to local hospitals or contract with local hospitals on a per diem or individual case basis	2	2	2[b], 4	2	1, 2	1	1	1
For convalescent home care	2	2	4	2	1	-	1	1
Operates a direct service program								
Operates diagnostic clinics	2	2	4, 7	2	1	1	1	1
Operates treatment clinics		2	4, 7		---		1	1
Provides nursing service for case-finding and follow-up		2	4	2	1	1	1	1
Provides braces and other orthopedic appliances	2	2	4	2	1	1	1	1
Operates crippled children's hospitals or general hospitals which accept crippled children on free or part-pay basis			7	-	1	---	-----	------
Provides post-hospital treatment (physical therapy)	2	2	4, 7	2	1	1	1	1
Renders additional service not covered in this classification	-	3	--	-	1	3, 9	----	-----
CANCER SERVICE								
Requires cancer morbidity reporting by law or regulation				-	1	-	-	-----
Conducts or participates in educational programs for early diagnosis	1	1		1	1	-- -	1	----
Distributes and/or administers financial grants-in-aid								
For local cancer clinics				-	- -	----	- 1	-----
For hospitalization of cancer patients			--			-----	1	----
Operates a direct service program								
Operates cancer diagnostic clinics	--	7		7		---	-- --	-----
Operates cancer treatment clinics	----	7	-	7	-	---	-----	------
Provides free tissue diagnostic service	----	7[b]	----	7	1	1	1	------
Operates cancer hospitals or general hospitals which accept cancer patients on a free or part-pay basis	--	7[c]	----	7	2	- -	-----	------
Engages in cancer research and/or special studies	-- -		-- -	1, 7	- --	1	-----	-- ---
PNEUMONIA SERVICE								
Trains physicians and/or laboratory technicians in pneumonia work	1	1	1	----	1	-----	-----	------
Does pneumococcus typing	1	1	1	-----	1	1	1	------
Makes chemical blood determinations (sulfonamides)	1	------	------	------	1	1	------	------
Distributes free diagnostic serum	1	1	-	-----	1	1	------	------
Distributes free therapeutic serum	1	------	1	-----	1	1	------	------
Distributes free drugs for treatment of pneumonia	1	------	1	------	1	------	------	------

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities in providing medical care for general and allied special conditions of the needy in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota
PREVENTION AND CARE OF BLINDNESS								
Promulgates and/or enforces State laws, rules, and regulations concerning routine use of prophylactic in eyes of newborn	----	1	1	----	1	1	1	1
Distributes silver nitrate free of charge for prevention of ophthalmia neonatorum	1	1	1	-	1	1	----	1
Operates refraction clinics	----	4, 7 [1]	-	7	- -	----	----	----
Operates trachoma clinics	----	--	---	-	----	--	--	----
Finances individual ophthalmological examinations or eye treatment service for the needy	----	2	--	----	2 [f]	3	----	2
Hospitalizes at State expense indigent patients needing eye operations or treatment (including trachoma cases)	2 [f]	2, 4, 7	5, 7	7	----	2	----	----
Makes special studies to determine causes of blindness	----	4	----	1	2	3	----	----
Operates or subsidizes sight-saving classes	---	3	----	9	3	----	----	----

Activity	State or Territory							
	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin
GENERAL MEDICAL CARE OF THE NEEDY								
Promotes local programs of medical care	-	-		2	--	-		----
Supervises and/or provides consultation service to local organizations			--	----	- -	-	2	----
Distributes and/or administers financial grants-in-aid								
For general home and office care—								
Through general relief funds to local units	---	2 [e]	---	--	2	2	2	2
Through specific funds to local units		---	- -	-	-	- -	----	----
For general hospital care—								
Through general relief funds to local units	--	---	--	----	2	2	2	- - -
Through specific funds to local units		-	----	----	----	---		2 [e]
Through subsidy to or contract with local hospitals			-	-	-	---	2 [e]	----
Operates a direct service program								
Furnishes or directly finances home and office care	---	----	--	2 [e]		----		----
Provides general clinic service for ambulatory patients		7		--	7 [b]	----	-	7
Operates general hospitals		7	--	----	7 [b]	----	5	7
Provides free ambulance service		--	- -	- -		----		--
Maintains special facilities for medical care of migratory laborers		-		---	----	-- -	----	2 [e]
Includes medical examination, physical restoration, and/or provision of artificial appliances in vocational rehabilitation services	3	--	--	--	3	----	2	4
Renders additional service not covered in this classification					-	---	----	2
SERVICES FOR CRIPPLED CHILDREN								
Conducts promotional and/or educational programs regarding prevention and treatment of crippling conditions	1	3	1	1	1	2	---	3
Supervises and/or provides consultation service to local organizations	1	3	1	1	1	2	----	3

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities in providing medical care for general and allied special conditions of the needy in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory: Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin
SERVICES FOR CRIPPLED CHILDREN—Continued.								
Distributes and/or administers financial grants-in-aid								
For local crippled children's clinics	1							
For hospital care: Through subsidy to local hospitals or contract with local hospitals on a per diem or individual case basis	1	3	1	1	1	2	2	
For convalescent home care	1		1		1		2	3
Operates a direct service program:								
Operates diagnostic clinics	1	3	1	1	1	2	2	3, 7
Operates treatment clinics	1		1	1	1	2	2	7
Provides nursing service for case-finding and follow-up	1	3	1	1	1		2	3
Provides braces and other orthopedic appliances	1	3	1	1	1	2	2	3, 7
Operates crippled children's hospitals or general hospitals which accept crippled children on free or part-pay basis		7			7[b]			7
Provides post-hospital treatment (physical therapy)	1	3	1	1	1	2	2	3, 7
Renders additional service not covered in this classification					2, 3		3	
CANCER SERVICE:								
Requires cancer morbidity reporting by law or regulation								1
Conducts or participates in educational programs for early diagnosis	1	1		1, 4		1		1
Distributes and/or administers financial grants-in-aid:								
For local cancer clinics								
For hospitalization of cancer patients				4				
Operates a direct service program.								
Operates cancer diagnostic clinics				4	7[b]			7[i]
Operates cancer treatment clinics				4	7[b]			7[i]
Provides free tissue diagnostic service		1		4, 7				1, 7
Operates cancer hospitals or general hospitals which accept cancer patients on a free or part-pay basis					7[b]			7
Engages in cancer research and/or special studies								1, 7
PNEUMONIA SERVICE.								
Trains physicians and/or laboratory technicians in pneumonia work		1	1		7			1
Does pneumococcus typing	1	1	1	1	1		1[f]	1
Makes chemical blood determinations (sulfonamides)		1	1	7	1			
Distributes free diagnostic serum		1			1			
Distributes free therapeutic serum		1	1		1		2[i]	
Distributes free drugs for treatment of pneumonia		1	1		1		2[i]	
PREVENTION AND CARE OF BLINDNESS								
Promulgates and/or enforces State laws, rules, and regulations concerning routine use of prophylactic in eyes of newborn	1	1		1	1	1	1	1
Distributes silver nitrate free of charge for prevention of ophthalmia neonatorum	1	1		1	1		1	1
Operates refraction clinics		1		7[i]	7[b]			7[i]
Operates trachoma clinics							1, 2	
Finances individual ophthalmological examinations or eye treatment service for the needy	1		2				2	
Hospitalizes at State expense indigent patients needing eye operations or treatment (including trachoma cases)	1, 2		2		7[b]	2[f]	2[f]	7[i]
Makes special studies to determine causes of blindness	1, 2		2, 4	2	4	2	1	
Operates or subsidizes sight-saving classes	1				4			3

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities in providing medical care for general and allied special conditions of the needy in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory				
	Wyoming	Alaska	Hawaii	Puerto Rico	Virgin Islands
GENERAL MEDICAL CARE OF THE NEEDY:					
Promotes local programs of medical care	-----	-----	1	1	-----
Supervises and/or provides consultation service to local organizations	-----	-----	1	1	-----
Distributes and/or administers financial grants-in-aid:					
For general home and office care—					
Through general relief funds to local units	-----	-----	-----	-----	-----
Through specific funds to local units	-----	-----	-----	-----	-----
For general hospital care—					
Through general relief funds to local units	-----	-----	-----	-----	-----
Through specific funds to local units	-----	-----	1	-----	-----
Through subsidy to or contract with local hospitals	-----	2	-----	-----	-----
Operates a direct service program:					
Furnishes or directly finances home and office care	-----	2	1	1	1
Provides general clinic service for ambulatory patients	-----	-----	-----	1	1
Operates general hospitals	-----	-----	-----	1	1
Provides free ambulance service	-----	-----	-----	-----	-----
Maintains special facilities for medical care of migratory laborers	-----	-----	-----	-----	-----
Includes medical examination, physical restoration, and/or provision of artificial appliances in vocational rehabilitation services	-----	-----	3	-----	-----
Renders additional service not covered in this classification	-----	-----	1	-----	-----
SERVICES FOR CRIPPLED CHILDREN:					
Conducts promotional and/or educational programs regarding prevention and treatment of crippling conditions	1	1	1	1	-----
Supervises and/or provides consultation service to local organizations	-----	1	1	1	-----
Distributes and/or administers financial grants-in-aid:					
For local crippled children's clinics	-----	-----	1	-----	-----
For hospital care: Through subsidy to local hospitals or contract with local hospitals on a per diem or individual case basis	1	1	1	1	-----
For convalescent home care	1	1	1	1	-----
Operates a direct service program:					
Operates diagnostic clinics	1	-----	1	1	-----
Operates treatment clinics	-----	-----	1	1	-----
Provides nursing service for case-finding and follow-up	1	1	1	1	-----
Provides braces and other orthopedic appliances	1	1	1	1	-----
Operates crippled children's hospitals or general hospitals which accept crippled children on free or part-pay basis	-----	-----	-----	1	-----
Provides post hospital treatment (physical therapy)	1	1	1	1	-----
Renders additional service not covered in this classification	-----	-----	3	-----	-----
CANCER SERVICE:					
Requires cancer morbidity reporting by law or regulation	-----	-----	-----	-----	-----
Conducts or participates in educational programs for early diagnosis	-----	-----	-----	-----	-----
Distributes and/or administers financial grants-in-aid.					
For local cancer clinics	-----	-----	-----	-----	-----
For hospitalization of cancer patients	-----	2 [1]	-----	-----	-----
Operates a direct service program.					
Operates cancer diagnostic clinics	-----	-----	-----	1 [1]	-----
Operates cancer treatment clinics	-----	-----	-----	1 [1]	-----
Provides free tissue diagnostic service	-----	-----	-----	-----	-----
Operates cancer hospitals or general hospitals which accept cancer patients on a free or part-pay basis	-----	-----	-----	1 [1]	1 [1]
Engages in cancer research and/or special studies	-----	-----	-----	-----	-----
PNEUMONIA SERVICE:					
Trains physicians and/or laboratory technicians in pneumonia work	-----	1	-----	-----	-----
Does pneumococcus typing	-----	1	1	-----	-----
Makes chemical blood determinations (sulfonamides)	-----	-----	-----	-----	-----
Distributes free diagnostic serum	-----	1	1	-----	-----
Distributes free therapeutic serum	-----	1	1	-----	-----
Distributes free drugs for treatment of pneumonia	-----		1	-----	-----
PREVENTION AND CARE OF BLINDNESS:					
Promulgates and/or enforces State laws, rules, and regulations concerning routine use of prophylactic in eyes of newborn	1	1	1	1	1
Distributes silver nitrate free of charge for prevention of ophthalmia neonatorum	-----	1	1	1	1
Operates refraction clinics	-----	1	-----	-----	1

See footnotes at end of table.

TABLE 4.—*Department of State government responsible for specific activities in providing medical care for general and allied special conditions of the needy in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory				
	Wyoming	Alaska	Hawaii	Puerto Rico	Virgin Islands
PREVENTION AND CARE OF BLINDNESS—Continued.					
Operates trachoma clinics					
Finances individual ophthalmological examinations or eye treatment service for the needy					
Hospitalizes at State expense indigent patients needing eye operations or treatment (including trachoma cases)		2 [i]		1	1 [l]
Makes special studies to determine causes of blindness			2		
Operates or subsidizes sight-saving classes	3				

*Code:
1. Health
2. Welfare
3. Education
4. Special boards or commissions
5. Board of control
6. Independent State hospital
7. State university or college
8. State legislature
9. Other departments of State government

**Allied special conditions include crippling conditions of children, cancer, pneumonia, and eye disorders.

[a] The department of health is really a division (Idaho) and bureau (Maine) of the department of welfare (Idaho) and the department of health and welfare (Maine).

[b] Two separate agencies of this classification participate in this activity.

[c] For selected groups, such as categorical relief clients, or under special conditions.

[d] The State general hospital is operated jointly by these two agencies.

[e] Three separate agencies of this classification (administering five institutions) participate in this activity.

[f] Not routinely, but occasionally; upon request only; as a demonstration project only; in the absence of local service.

[g] Indirectly, through subsidy to a private hospital which operates the clinic; indirectly, by paying for service rendered privately, indirectly, through subsidy to a local subdivision.

[h] The grant-in-aid is made to another State agency which renders direct service; the grant-in-aid is made to a voluntary agency which renders direct service.

[i] Not specifically for this condition, but as part of the program of general medical care afforded by this agency.

[j] For hospital patients only; for pupils of the State school for the blind only.

[k] Law or regulation applies to midwives only or to maternity hospitals only.

[l] Not as such, though refractions are sometimes included in the service of general "eye" clinics.

GENERAL MEDICAL SERVICES

Departments of welfare and State university hospitals are the State agencies most frequently concerned in arrangements for general medical care, although hospital commissions, independent State general hospitals, and health departments also function for this purpose in certain jurisdictions. In the aggregate, nearly three-fourths of the States participate in some way in the provision of general medical care for the needy. Rarely, however, is home or office care administered directly by the State, except for selected groups, such as categorical relief clients. Instead, where a State agency participates it extends financial aid to local political subdivisions which, in turn, arrange for some type of direct service. As a rule, the medical care afforded is not organized as a distinct and separate entity but is merely allowed for as one item of a generalized public assistance program which also includes provision for food, shelter, and clothing.

Frequently these local programs of home and office care are not set up in a fashion sufficiently well-defined to enable the parent agency

either to describe the policies pursued or to measure the service rendered. Furthermore, within a single State there may be any number of different plans in operation. Physicians may be compensated according to a set fee schedule, they may be employed on a full- or part-time salary basis, or there may be in operation some sort of scheme whereby a central fund is built up from periodic contributions of those covered by the plan. Rates are sometimes determined by the State and sometimes by the local community. Usually the medical care contemplated is that which might be given by a general practitioner in his office, plus emergency surgery. Service is sometimes restricted to professional ministrations and sometimes extended to include drugs and supplies. Finally, economic eligibility for service is defined in such varying terms as "clients of general relief," "medically indigent," "those unable to pay privately for needed care," and "wards of the State." One State facility goes so far as to designate actual income limits, while other governmental units of the same State offer similar medical service under more general economic restrictions. Residence requirements also reflect the individuality of States and even of their subdivisions.

Because of the indirect and dissimilar administrative methods employed, less than half of the States which make financial grants for medical care through the medium of general relief possess records showing either the exact type of service afforded, the number of persons served, or the cost to the State of the services rendered. Besides, due to the multiplicity of practices, it is difficult for a State agency to maintain supervisory control over local systems of general medical care. Although several States require that the plans of all State-aided county services be submitted for approval before financial assistance is given, others make no attempt at formal check of local procedures. On the contrary, contact of the State agency is limited to general observation, with little cognizance of the intimate details of operation. In an effort to improve the more or less loosely knit pattern of general home and office care which is partially supported by the State, a few jurisdictions have drafted uniform plans and procedures to be followed by all local units participating in cooperative programs of general medical care. At the time these data were collected, however, the units of State government had not yet reached the point of having their proposed plans adopted by all of the local agencies involved. One State was engaged in making a careful study of its total medical care problem with a view to gradual development of more consistent policies for State-aided medical care of the needy.

Pennsylvania, the District of Columbia, the three Territories, and the Virgin Islands directly finance home and office care for indigents.

In Pennsylvania such service is provided at State expense by private practitioners who serve according to a previously established fee schedule, while in the other jurisdictions it is rendered by physicians employed at a full- or part-time salary on the staff of the administrative State agency. The Pennsylvania program includes bedside nursing as well as medical care in the home. Drugs and supplies are also furnished by the several jurisdictions which operate direct State programs of home and office care.

In two-fifths of the States some measure of medical care is provided ambulatory patients through the out-patient department of the State general hospital. More than half of these institutions are operated by the State university or college and function primarily as teaching hospitals. Presumably, any needy resident of the State who can be accommodated is eligible for service. Actually, however, there is some selectivity of patients—even within the same economic group, for the number of persons who can be accepted is limited, and those living within a short distance of any health facility naturally derive the most benefit. The function of the State agency in supplying medical care through these hospital clinics is, of course, that of direct service.

Thirty-six States reported that they participate in the provision of general hospital care, either on a free or part-pay basis, for needy bed patients. This does not mean, of course, that each of these States is equipped to hospitalize any person of the lower income brackets for whom such care might be indicated. In the States which function through direct operation of one or more general hospitals, the volume of service which can be rendered is determined by the bed capacity of these State-owned institutions. In the jurisdictions which partially finance general hospital care supplied locally, patients hospitalized are usually restricted to those requiring emergency surgery. Eight of the States which participate in furnishing general hospital care supply the service through State-operated hospitals exclusively; 12 utilize local hospitals only, and the State financially assists the local institutions which cooperate; the remaining 16 States which make some provision for general hospital care follow a combination of the two plans.

Admission to State general hospitals is usually based upon a patient's residence within a jurisdiction—sometimes for a stated period—and upon his financial inability to pay privately for the care needed. In a few instances definite income limitations are noted. As to methods of financing the cost of hospitalization, there are many and diverse procedures. In some instances, hospital care by State agencies is provided wholly at State expense. In others, the county from which a patient is admitted and the State share expenses equally. Again, the State bears a specific portion of the cost (usually one-half) and the patient, when able to do so, pays the remainder. In the event

that a patient is unable to pay his share of the bill, his county makes up the deficit. Another situation is that whereby each county is allotted a certain number of beds which may be utilized fully at State expense. When the county's quota is exceeded, hospitalization of additional patients is charged to the local community. According to still another plan, all professional services are provided at State expense, but the patient bears the cost of his room. A few State university hospitals restrict free admission to patients who fill the teaching needs of the affiliated medical schools.

Several States, notably Iowa, Louisiana, and the District of Columbia, operate a fleet of ambulances routed to all sections for free transportation of patients to and from the State hospital. In other areas transportation is dependent upon either the patient or some local agency.

State aid to local general hospitals is administered according to several distinct plans Upon occasion, the State legislative body makes direct grants to selected local hospitals, which in turn accept free or part-pay patients. More often, such a subsidy fund is administered by the department of welfare, the health department, or the board of control. Payments are made either in a lump sum or at a stated rate per patient day and reach the hospital either directly or indirectly, through the local health or welfare organization. Funds so transmitted from the State to the local level are earmarked specifically for hospital care. Under a third system of State participation in local hospital service for the needy, no designated amount is assigned to this purpose. Hospital care is simply one item included in the general relief program, which is jointly financed by the State and county. About half of the 28 States which give some form of financial aid to local hospitals operate to some extent in the last fashion described; however, only 4 of these States rely entirely upon this system. The others, in addition, either maintain a State hospital or allocate some funds specifically for hospital care. With several exceptions, only a negligible amount of supervision is exercised by State agencies over the local hospitals to which they give financial assistance.

Besides the various direct and indirect provisions for medical care available to all persons eligible for general relief or otherwise unable to pay for necessary home, office, or hospital service, a number of States make special arrangements for selected categorical relief groups. Dependent children, recipients of old age insurance, clients of unemployment relief, and indigent blind persons are outstanding among such groups. Medical care for beneficiaries of these classes, as for general public assistance clients, is sometimes financed directly by the State and again furnished through State grants-in-aid to counties. When the latter procedure is followed, it is customary for the State to designate the actual amount which may be used for medical care.

Furthermore, in certain areas where migratory laborers have assembled, the State has initiated health services for these migrants. Such undertakings, predominantly sanitation activities, are engaged in by 11 States. Of this number, 4 jurisdictions include some measure of medical care in their health set-up for itinerant laborers. Placement of responsibility for medical aid to ill migratory workers may be determined from table 4.

Correction of physical disabilities incident to vocational rehabilitation represents still another State activity for the restoration of health to a selected population group. It is recognized, of course, that physical care is subsidiary to training, guidance, and placement in the complete vocational rehabilitation programs. The fact that practically all States participate in some sort of vocational adjustment for the disabled, but that only 8 report physical reconstruction, points to the relative weight of medical or surgical treatment in the total State plan. Physical examinations for the purpose of diagnosis are furnished by 8 additional States, however, and 23 supply prosthetic appliances for the handicapped.

ALLIED SPECIAL [5] MEDICAL SERVICES

Services for crippled children.—Crippled children's services have been greatly st mulated by Federal grants-in-aid made specifically for this purpose under title V of the Social Security Act of 1935. As a result of this impetus, 52 of the 53 jurisdictions under consideration operate organized programs for the care of crippled children. State programs for crippled children, which- without exception—are cooperatively financed by State and Federal funds, comprise the following major elements: Case-finding, diagnosis, treatment, and convalescent care.

Although relative uniformity obtains among the several States in program content and in definition of beneficiaries, there is considerable variation both as to the agency which is identified with the program and as to the administrative methods employed. State activities for crippled children are administered by the health department in half of the jurisdictions and by the department of welfare in one-fourth of them. A special crippled children's commission operates in 6 States while the department of education is the responsible agent of 4. Two of the remaining areas are served by a branch of the State university, and 1, by the board of control. In a number of instances, other units of State government collaborate with the department or commission pr marily accountable, as may be observed in table 4. State university hospitals, in particular, render complementary services

[5] See footnote 4

Location of all crippled children in the State who are not under treatment is the first step in building a coordinated program. Surveys, reports to the central agency, and census information are used as bases for establishment of a State crippled children's register.

Clinic service for crippled children is provided by the State, either directly, by actual operation thereof, or indirectly, through financial subsidy to local subdivisions or hospitals which maintain the facilities. Table 4 indicates that the former practice is the one generally followed. Crippled children's clinics are conducted by orthopedic surgeons, who may be staff members of the administrative agency, or who may be employed on a fee or part-time salary basis. It is not unusual for clinicians even to contribute their services gratis. Whereas some clinics are held at regular and frequent intervals in permanent centers, others are served by an itinerant staff which returns to a community as seldom as once or twice a year, or which may hold only a single session at a given point. The number of itinerant staffs employed varies, as do the number of clinic centers established. Although minor dispensary service, such as application, adjustment, and removal of casts and braces, and instruction in physical therapy are offered in most clinics, actual treatment facilities for ambulatory patients are not included in many of them.

In practically all instances, nurses are attached to the staff of the administrative agency for the purpose of case-finding, stimulation of clinic attendance, and making follow-up home visits to patients after the clinic sessions. Furthermore, they act as instructors and supervisors of local public health nurses who supplement the direct service rendered by State personnel.

Outstanding among State services for crippled children is the surgical and hospital care necessary for improvement or correction of the crippling condition. The most usual plan of providing hospital care for crippled children involves an arrangement whereby State patients are admitted to local hospitals at a stipulated per diem rate, which is paid by the responsible agency. Uniform fee schedules for specific types of surgery are established, likewise. Frequently the orthopedic surgeon who conducts the diagnostic clinics also performs the operations indicated. According to some plans, his clinician's fee covers operative service as well. In 12 jurisdictions, State-owned orthopedic hospitals are utilized for crippled children served by the State, and in 7, State-controlled general hospitals admit beneficiaries of the official State crippled children's programs. State crippled children's hospitals are operated by universities, departments of welfare, and health departments, in the order of frequency listed. In one State each, a board of control and an independent board of trustees functions as the control agency. Hospitalization of crippled children in State institutions does not preclude the same jurisdiction from arranging for care of

additional patients in local hospitals. As a matter of fact, 16 States report that both systems are followed. Braces and other orthopedic appliances are consistently furnished by the State when they are not available from any other source.

Inasmuch as complete recovery from many operations for crippling conditions represents a long-term procedure, simple convalescent care may be a satisfactory substitute for hospitalization during a portion of this time. Since stay in a convalescent home is less expensive than in a hospital, this item is included in the programs of about two-thirds of the States.

Physical therapy, which may or may not include hydrotherapy for discharged hospital patients, is another step in a State's complete plan for physical rehabilitation of crippled children. Physical therapy treatments at State expense are available in most areas both to children who have returned to their own homes and to those maintained by the State in convalescent homes.

Providing vocational training, operating special schools or classes for the crippled, and supplying bedside teachers for hospital or convalescent home cases are activities closely associated with the medical programs. Notwithstanding, discussion of educational measures for the handicapped does not fall within the scope of this report.

For more detailed consideration of crippled children's programs, the reader is referred to Bureau Publication No. 258 of the United States Children's Bureau.[6] It must be borne in mind, however, that the Children's Bureau publication describes participation not only of official State agencies but also of collaborating local groups.

Cancer service.—Unlike medical services for crippled children, which were supplied by all but one jurisdiction, State provisions for cancer control were principally in a developmental stage during the survey year (1940). Twelve States reported no activities whatever for cancer control as such; functions of 6 were restricted to educational procedures or special statistical studies for determination of cancer prevalence by various types and sites in different population groups; in another, Illinois, plans for a well-organized program had been formulated, but actual operation had not begun; 2 more, the District of Columbia and Oklahoma, reported "proposed" or "contemplated" plans. For this report, however, analysis is restricted to programs which were in actual operation. In Hawaii, legislation has been enacted which charges the Territorial Board of Health with purchase and distribution of radium for the treatment of cancer. However, no action had yet been taken at the time of this survey.

In only 12 States is cancer morbidity reporting required either by law or regulation; however, 4 additional States have developed volun-

[6] Services for crippled children under the Social Security Act—Development of program 1936–39. Bureau Publication No. 258. Children's Bureau, U. S Department of Labor Government Printing Office, Washington, 1941:

tary reporting schemes. Education of the public with regard to symptoms which may be indicative of cancer and to the importance of early diagnosis usually constitutes the first step in an organized State program for cancer control. Twenty-eight health departments and three cancer commissions either singly or jointly engage in educational pursuits. Not infrequently they operate in conjunction with the Women's Field Army, a voluntary organization which directs its efforts toward reduction of cancer mortality.

The position of the health department is far less prominent with respect to provision of diagnostic and treatment facilities for needy cancer patients than with respect to participation in educational activities. Only 6 health departments either operate or subsidize diagnostic or treatment clinics and 6 afford hospitalization under one system or the other. Laboratory facilities for tissue diagnostic service (histopathologic) are available in 12 State health departments.

Medical schools or hospitals of State universities, on the other hand, concentrate on supplying actual service rather than upon promotional efforts. Nine institutions of this classification operate cancer clinics. Both clinical diagnostic and treatment services are offered by 8 of them, and diagnosis only is performed in the other. All 9 of these State universities hospitalize cancer patients. Moreover, tissue diagnostic service is furnished free of charge by 10 agencies of this type. Such service may or may not be restricted to hospital patients.

In 3 States a special cancer commission is charged with administration of a complete service program; in another, both diagnostic and treatment facilities are operated by State general hospitals administered by independent boards of trustees. Only 3 States maintain special cancer hospitals. Two of these are under health department control, and 1 is operated by a cancer commission.

Laboratory research is an important feature of 5 State cancer programs, and 7 additional States engage in research which is statistical in character only.

More recent information gathered by Scheele [7] points to health department progress in the field of cancer control. His article includes description of several active service programs which had not advanced beyond the "planning" stage at the time of the survey herewith reported. Also, the list of departments engaging in lay and professional education had lengthened during the short interim. In some respects, however, the present report is more comprehensive than the one dealing with later developments [7] Activities of all State agencies which function in any way for cancer control are

[7] Scheele, Leonard A Present status of cancer control programs Read before the Health Officers' Section of the American Pub Health Assoc at its 70th annual meeting, Oct. 15, 1941. To be published in an early issue of PUBLIC HEALTH REPORTS

incorporated in this discussion, while only programs of State health departments and State cancer commissions are described in the other paper.

Pneumonia service.—Inasmuch as measures for the reduction of pneumonia mortality involve curative rather than preventive procedures, activities of the several States for pneumonia control are included in the discussion of medical care, instead of in chapter II of this series, which was devoted *to control of general communicable* diseases. Almost without exception, in States which have started pneumonia control activities such services are in the hands of the State health department. In 13 States, however, no plan has been initiated for supplying pneumonia service The function of 4 more States is restricted to their inclusion of pneumococcus typing as part of the regular diagnostic services of the State public health laboratory.

During the survey year, most health departments which were actively engaged in pneumonia service sponsored establishment of typing stations at strategic points throughout the State. These stations were sometimes operated directly by the health department; at other times they were maintained by local health units or hospitals which received free typing serum from the State. Under one system or the other, typing service was reported by nearly three-fourths of the State health departments. In addition to furnishing typing serum for use in selected laboratories, a number of State health departments have assumed responsibility for training laboratory technicians in approved typing methods.

In view of the rapid changes in pneumonia therapy, acquaintance of general practitioners with the latest developments in diagnosis and treatment is believed to be an important step in reduction of the pneumonia mortality rate. Consequently, nearly half of the State health departments engage in educational activities for physicians.

Of the two treatment methods in use during 1940 (serum and sulfonamide compounds) serum is the older and—when data were being collected for this study— the one more commonly in use. In about one-half of the States therapeutic serum was distributed by the State health department. However, the survey year really represented a transition period in pneumonia control. At that time the advantages of treating the disease with sulfonamide preparations had not been established over a sufficient span of time to warrant its exclusive use. Even then, more than one-third of the States were supplying free sulfapyridine as well as pneumonia typing services and therapeutic serum.

Occasionally demonstration projects for local nursing groups centering about home nursing care for pneumonia patients are conducted. Likewise, a few health departments make special investigations of the recovery rate of persons treated with State-supplied materials.

Neither hospitalization, provision of oxygen, nor physician's home care is a routine feature of State pneumonia control programs.

With pneumonia control, as with all other State health activities covered by this study, there has been no attempt to analyze the volume of service afforded. Although treatment programs of the several States may be similar, the number of persons benefited thereby may vary greatly.

Prevention and care of blindness.—With the development of social security programs, specifically those identified with aid to the blind, the number of blind persons in need of public assistance was discovered to be of sufficient size to demand that State effort be focused upon prevention and correction of conditions leading to partial or total blindness. For years, educational and vocational training of the blind have been regarded as State responsibility. Prevention of infant blindness has received health department attention over a considerable period of time also, but entry of the State into other fields of sight conservation or restoration is relatively recent.

State health departments, without exception, now promote the instillation of silver nitrate or other acceptable prophylactics into the eyes of newborn infants. All but six States either by law or regulation require that this be done routinely, though in a few of them the requirement pertains only to births attended by midwives or to those occurring in maternity homes. Several of the remaining States have enacted legislation directing that "drops" be used whenever "presence of ophthalmia neonatorum is suspected." Even where there is no legal backing for the practice, the health department urges its use. Forty-four State health departments distribute silver nitrate free of charge to midwives and physicians practicing in their respective jurisdictions.

Another common eye disease for which several departments of health and welfare have instituted definite control programs is trachoma. Two State health departments operate hospitals for the treatment of trachoma cases exclusively, while a third finances hospital treatment of trachoma on an individual case basis. Provision of diagnostic and treatment service through trachoma clinics is reported by four health departments and three departments of welfare.

In an effort to discover remediable eye disorders which might later lead to complete loss of sight, 15 States have undertaken establishment of refraction clinics. The State university hospital operates these clinics more frequently than any other agency, though several commissions for the blind, departments of welfare, and health departments function in the same capacity. State general hospitals administered by independent boards of trustees and the State school for the blind operate refraction clinics in one jurisdiction each. In

addition to the 15 States offering clinic service, 14 more finance individual ophthalmological examinations, chiefly for persons applying for financial aid to the blind.

Hospitalization, including surgery, is afforded selected groups of patients at State expense in virtually two-thirds of the areas. Restrictions imposed for availability of hospital care vary from State to State. Circumstances under which such service is attainable in a few States with relatively well-developed programs are cited:

Arkansas.—If a patient's income is less than $30 per month, hospitalization for restoration of sight and for sight conservation is provided at State expense.

Illinois.—Hospital service is available through the State-owned eye and ear hospital (220 beds) to any person with eye ailments who is referred by local welfare agencies.

Iowa.—Remedial treatment is given at State expense for any needy blind patient. The applicant has a choice of securing service either locally or at the State university hospital. Maximum payment by the State agency for local service is $75. Approval for remedial service is given by the State consulting ophthalmologist. The patient must be referred to him by a local examining physician.

Kansas.—When an applicant for "Aid to the Blind" assistance is examined, any recommendations for treatment are carried out with State funds. All clients eligible for any type of public assistance are accepted for treatment also. All remedial service is subject to the approval of the State ophthalmologist.

Mississippi.—Surgery is afforded by the State for all eye cases who, within the judgment of the State ophthalmologist, require such treatment.

In approximately 20 percent of the States which offer hospital care for eye cases, the service represents one item of a broad program of medical care rather than a service for the blind as a special group.

DENTAL SERVICES

At the time of this survey the State health department with but few exceptions was giving some attention to possibilities for improving the dental health of the citizenry which it served. In addition, 10 departments of welfare, 5 State universities, 4 departments of education, and 1 State hospital board also contributed in one way or another to the total State effort to preserve or restore dental health.

A complete dental health program embraces both children and adults. While source material does not show the extent to which participating units of State government engaged in either form of service, information was obtained as to whether or not any provision was made for specific types of dentistry. In table 5 are entered the results of this inquiry.

To a marked degree, attention of the State health department is confined to children's dentistry, and educational measures constitute the framework of health department activity. Indeed, for the country as a whole, operation of direct service facilities is subsidiary to the teaching functions. Only half of the State health organizations

actually render tangible dental service, while all but six of them carry on some kind of educational activities. Moreover, a sizable portion of the States which operate service units do so only for demonstration or educational purposes.

That dental activities of State health departments are in process of expansion is indicated by comparing 1940 programs with those of 1938, as described in Public Health Bulletin No. 251.[8] During the 2-year interval seven departments which formerly engaged in no form of dental hygiene have introduced some type of activity, and five, which participated in educational measures only, have broadened their programs to include clinical service as well.

TABLE 5.—*Department of State government* responsible for specific dental services** in each State and Territory, the District of Columbia, and the Virgin Islands*

Activity	State or Territory							
	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia
Promotes local dental health programs	1	-----	1	-----	1	-----	-----	-----
Conducts dental educational programs:								
For the general public	1	-----	1	1	1	1	1	1
For recipients of maternity services	-----	-----	-----	1	-----	1	1	1
For preschool and/or school children	1	-----	1	1	1	1	1	1
For dentists and/or dental hygienists	1	-----	1	1	-----	-----	1	1
For school teachers and/or teacher-training students	1	-----	-----	1	-----	-----	-----	1
Supervises and/or provides consultation service to local organizations	1	-----	-----	1	1	-----	-----	-----
Distributes and/or administers grants-in-aid:								
Subsidizes local dental services for children	1	-----	1	-----	-----	-----	-----	-----
Subsidizes local dental services for adults	-----	-----	-----	-----	-----	-----	-----	-----
Operates a service program:								
Makes dental surveys and/or special dental studies	-----	-----	-----	1	-----	-----	1	-----
Operates dental clinics** for children	-----	-----	1	1	-----	1	1	1
Includes the following services—								
Examination	-----	-----	1	1	-----	1	1	1
Prophylaxis	-----	-----	1	1	-----	1	1 [g]	1
Emergency dentistry	-----	-----	1	1	-----	-----	-----	1 [g]
General dentistry	-----	-----	1	1 [f]	-----	-----	-----	1 [g]
Finances dental care given children in private offices	-----	-----	-----	-----	-----	-----	-----	-----
Includes the following services—								
Examination	-----	-----	-----	-----	-----	-----	-----	-----
Prophylaxis	-----	-----	-----	-----	-----	-----	-----	-----
Emergency dentistry	-----	-----	-----	-----	-----	-----	-----	-----
General dentistry	-----	-----	-----	-----	-----	-----	-----	-----
Operates dental clinics** for adults	-----	-----	-----	1 [d]	-----	-----	-----	1 [d]
Includes the following services—								
Examination	-----	-----	-----	1 [d]	-----	-----	-----	1 [d, g]
Prophylaxis	-----	-----	-----	1 [d]	-----	-----	-----	1 [d, g]
Emergency dentistry	-----	-----	-----	1 [d]	-----	-----	-----	1 [d, g]
General dentistry	-----	-----	-----	-----	-----	-----	-----	1 [d, g]
Finances dental care given adults in private offices	-----	-----	-----	1 [d]	-----	-----	-----	-----
Includes the following services—								
Examination	-----	-----	-----	-----	-----	-----	-----	-----
Prophylaxis	-----	-----	-----	-----	-----	-----	-----	-----
Emergency dentistry	-----	-----	-----	1 [d]	-----	-----	-----	-----
General dentistry	-----	-----	-----	-----	-----	-----	-----	-----
Renders additional service not covered in this classification	-----	-----	-----	-----	-----	-----	1	-----

See footnotes at end of table.

[8] Cady, F. C.: Dental health organizations in State departments of health of the United States. Pub. Health Bull. No. 251. Government Printing Office, Washington, 1939.

TABLE 5.—*Department of State government responsible for specific dental services in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky
Promotes local dental health programs	1	1	------	1	------	1	1	------
Conducts dental educational programs:								
For the general public	1	1	------	1	1, 3	1, 4	1	1
For recipients of maternity services	------	------	------	------	------	------	1	------
For preschool and/or school children	1	1	------	1	1	1	1	1
For dentists and/or dental hygienists	1	1	------	1	1, 4	1, 4	1	1
For school teachers and/or teacher-training students	1	------	------	1	1, 3	1	1	------
Supervises and/or provides consultation service to local organizations	1	1	------	1	------	1, 4	1	------
Distributes and/or administers grants-in-aid:								
Subsidizes local dental services for children	1	------	------	------	------	1[b]	1	------
Subsidizes local dental services for adults	------	------	------	------	------	1[b], 2[c]	------	------
Operates a direct service program:								
Makes dental surveys and/or special dental studies	------	1	------	1	------	1	1	------
Operates dental clinics** for children	------	------	------	1	1[f]	4[g]	------	1
Includes the following services—								
Examination	------	------	------	1	1[f]	4[g]	------	1
Prophylaxis	------	------	------	------	1[f]	4[g]	------	1
Emergency dentistry	------	------	------	------	1[f]	4[g]	------	1
General detistry	------	------	------	------	1[f]	4[g]	------	1
Finances dental care given children in private offices	------	------	------	------	------	------	------	------
Includes the following services—								
Examination	------	------	------	------	------	------	------	------
Prophylaxis	------	------	------	------	------	------	------	------
Emergency dentistry	------	------	------	------	------	------	------	------
General dentistry	------	------	------	------	------	------	------	------
Operates dental clinics** for adults	------	------	------	------	------	4[g]	------	------
Includes the following services—								
Examination	------	------	------	------	------	4[g]	------	------
Prophylaxis	------	------	------	------	------	4[g]	------	------
Emergency dentistry	------	------	------	------	------	4[g]	------	------
General dentistry	------	------	------	------	------	4[g]	------	------
Finances dental care given adults in private offices	------	------	------	------	------	------	------	------
Includes the following services—								
Examination	------	------	------	------	------	------	------	------
Prophylaxis	------	------	------	------	------	------	------	------
Emergency dentistry	------	------	------	------	------	------	------	------
General dentistry	------	------	------	------	------	------	------	------
Renders additional service not covered in this classification	------	------	------	1	4	1, 4	------	------

See footnotes at end of table.

TABLE 5.—*Department of State government responsible for specific dental services in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Louisiana	Maine •	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri
Promotes local dental health programs	-----	-----	1	1	1	1	1	1
Conducts dental educational programs:								
For the general public	-----	1	1	1	1	1	1	1
For recipients of maternity services	-----	1	-----	-----	-----	1	1	-----
For preschool and/or school children	-----	1	1	1	1	1	1	1
For dentists and/or dental hygienists	-----	1	1	1	1	1	1	1
For school teachers and/or teacher-training students	-----	1	1	1	1	1	1	1
Supervises and/or provides consultation service to local organizations	-----	-----	1	1	1	1	1	1
Distributes and/or administers grants-in-aid:								
Subsidizes local dental services for children	-----	-----	1	-----	-----	-----	-----	-----
Subsidizes local dental services for adults	-----	-----	1[d]	-----	-----	2•	-----	-----
Operates a direct service program:								
Makes dental surveys and/or special dental studies	-----	-----	-----	1	-----	1	-----	1
Operates dental clinics** for children	5	1	1	1[f]	1[f]	-----	1[f]	-----
Includes the following services—								
Examination	5	1	1	1[f]	1[f]	-----	1[f]	-----
Prophylaxis	5	1	1	-----	-----	-----	1[f]	-----
Emergency dentistry	5	1	1	-----	-----	-----	-----	-----
General dentistry	5	1	1[g]	-----	-----	-----	-----	-----
Finances dental care given children in private offices	-----	-----	-----	-----	-----	2[g]	-----	-----
Includes the following services—								
Examination	-----	-----	-----	-----	-----	-----	-----	-----
Prophylaxis	-----	-----	-----	-----	-----	-----	-----	-----
Emergency dentistry	-----	-----	-----	-----	-----	-----	-----	-----
General dentistry	-----	-----	-----	-----	-----	2[g]	-----	-----
Operates dental clinics** for adults	5	-----	-----	-----	-----	4	1[g]	-----
Includes the following services—								
Examination	5	-----	-----	-----	-----	4	-----	-----
Prophylaxis	5	-----	-----	-----	-----	4	1[g]	-----
Emergency dentistry	5	-----	-----	-----	-----	4	-----	-----
General dentistry	5	-----	-----	-----	-----	4	-----	-----
Finances dental care given adults in private offices	-----	1•	-----	-----	-----	-----	-----	-----
Includes the following services—								
Examination	-----	1•	-----	-----	-----	-----	-----	-----
Prophylaxis	-----	1•	-----	-----	-----	-----	-----	-----
Emergency dentistry	-----	1•	-----	-----	-----	-----	-----	-----
General dentistry	-----	1•	-----	-----	-----	-----	-----	-----
Renders additional service not covered in this classification	5	1	1	-----	-----	-----	-----	-----

See footnotes at end of table.

TABLE 5.—*Department of State government responsible for specific dental services in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina
Promotes local dental health programs		1			1		1	
Conducts dental educational programs:								
For the general public		1	1		1		1	1
For recipients of maternity services			1			1	1	1
For preschool and/or school children		1	1		1		1	1
For dentists and/or dental hygienists	1	1	1				1	1
For school teachers and/or teacher-training students					1		1	1
Supervises and/or provides consultation service to local organizations					1		1	
Distributes and/or administers grants-in-aid:								
Subsidizes local dental services for children				1				
Subsidizes local dental services for adults					1, 2[e]	1[d]	1[d], 2[e]	1[d]
Operates a direct service program:								
Makes dental surveys and/or special dental studies								
Operates dental clinics** for children			1		1[f]			1
Includes the following services—								
Examination			1		1[f]			1
Prophylaxis			1		1[f, g]			1
Emergency dentistry			1		1[f]			1[g]
General dentistry			1		1[f, g]			1[g]
Finances dental care given children in private offices							1	
Includes the following services—								
Examination							1	
Prophylaxis							1	
Emergency dentistry								
General dentistry								
Operates dental clinics** for adults			1[d]					
Includes the following services—								
Examination			1[d]					
Prophylaxis			1[d]					
Emergency dentistry			1[d]					
General dentistry			1[d]					
Finances dental care given adults in private offices								
Includes the following services—								
Examination								
Prophylaxis								
Emergency dentistry								
General dentistry								
Renders additional service not covered in this classification								

See footnotes at end of table.

TABLE 5.—*Department of State government responsible for specific dental services in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota
Promotes local dental health programs	------	1	1	------	1	1	------	1
Conducts dental educational programs:								
For the general public	------	------	1	1	------	------	1	------
For recipients of maternity services	------	------	------	1	1	------	1	------
For preschool and/or school children	------	1	1	1	1	1	1	1
For dentists and/or dental hygienists	1	1	1	1	1	------	1	------
For school teachers and/or teacher-training students	------	------	1	1	1	1	1	1
Supervises and/or provides consultation service to local organizations	------	------	1	------	1	1	------	------
Distributes and/or administers grants-in-aid:								
Subsidizes local dental services for children	------	------	1	------	1	------	------	------
Subsidizes local dental services for adults	2[c, e]	2[e]	1[e]	------	------	------	1[d]	------
Operates a direct service program:								
Makes dental surveys and/or special dental studies	------	1	1	------	------	------	------	------
Operates dental clinics** for children	------	1[f], 4	1[e]	------	1	1[e]	1	1
Includes the following services—								
Examination	------	1[f], 4	1[e]	------	1	1[e]	1	1
Prophylaxis	------	4	1[e, g]	------	1[g]	1[e]	1[g]	1
Emergency dentistry	------	4	1[e, g]	------	------	1[e]	1[g]	------
General dentistry	------	4	1[e, g]	------	------	1[e]	1[g]	------
Finances dental care given children in private offices	------	------	------	------	2[e]	------	------	------
Includes the following services—								
Examination	------	------	------	------	------	------	------	------
Prophylaxis	------	------	------	------	------	------	------	------
Emergency dentistry	------	------	------	------	2[e]	------	------	------
General dentistry	------	------	------	------	------	------	------	------
Operates dental clinics** for adults	------	4	1[e]	------	1[d]	------	------	------
Includes the following services—								
Examination	------	4	------	------	1[d]	------	------	------
Prophylaxis	------	4	------	------	1[d]	------	------	------
Emergency dentistry	------	4	1[e, g]	------	------	------	------	------
General dentistry	------	4	------	------	1[d]	------	------	------
Finances dental care given adults in private offices	------	------	------	------	2[e]	2[c, g]	------	------
Includes the following services—								
Examination	------	------	------	------	------	------	------	------
Prophylaxis	------	------	------	------	------	------	------	------
Emergency dentistry	------	------	------	------	2[e]	2[c, g]	------	------
General dentistry	------	------	------	------	------	------	------	------
Renders additional service not covered in this classification	------	------	1	------	------	------	------	------

See footnotes at end of table.

TABLE 5.—*Department of State government responsible for specific dental services in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued.

Activity	State or Territory							
	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin
Promotes local dental health programs	1	1	1	------	1	1	1	1
Conducts dental educational programs:								
For the general public	1	1	1	1	1	1	------	1
For recipients of maternity services	------	------	------	------	------	------	1	1
For preschool and/or school children	1	1	1	1, 3	1	1	1	1
For dentists and/or dental hygienists	1	1	1	1	1	1	------	1
For school teachers and/or teacher-training students	1	------	1	1	1	------	1	1
Supervises and/or provides consultation service to local organizations	1	1	1	------	1	------	1	1
Distributes and/or administers grants-in-aid:								
Subsidizes local dental services for children	1	1	------	1	------	------	1	------
Subsidizes local dental services for adults	------	------	------	------	------	------	1[d]	2[e]
Operates a direct service program:								
Makes dental surveys and/or special dental studies	------	------	1	1	1	------	1	------
Operates dental clinics** for children	------	1	1	------	1, 4	------	------	------
Includes the following services—								
Examination	------	1	1	------	1, 4	------	------	------
Prophylaxis	------	1	1	------	1, 4	------	------	------
Emergency dentistry	------	1	1	------	1, 4	------	------	------
General dentistry	------	1[e]	1	------	1	------	------	------
Finances dental care given children in private offices	------	------	------	------	------	------	------	------
Includes the following services—								
Examination	------	------	------	------	------	------	------	------
Prophylaxis	------	------	------	------	------	------	------	------
Emergency dentistry	------	------	------	------	------	------	------	------
General dentistry	------	------	------	------	------	------	------	------
Operates dental clinics** for adults	------	------	------	------	4	------	------	------
Includes the following services—								
Examination	------	------	------	------	4	------	------	------
Prophylaxis	------	------	------	------	4	------	------	------
Emergency dentistry	------	------	------	------	4	------	------	------
General dentistry	------	------	------	------	------	------	------	------
Finances dental care given adults in private offices	------	------	------	------	------	------	2[c]	------
Includes the following services—								
Examination	------	------	------	------	------	------	------	------
Prophylaxis	------	------	------	------	------	------	------	------
Emergency dentistry	------	------	------	------	------	------	2[c]	------
General dentistry	------	------	------	------	------	------	------	------
Renders additional service not covered in this classification	1	------	------	------	------	------	------	------

See footnotes at end of table.

TABLE 5.—*Department of State government responsible for specific dental services in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued.

Activity	State or Territory				
	Wyoming	Alaska	Hawaii	Puerto Rico	Virgin Islands
Promotes local dental health programs	-	---	--	1	------
Conducts dental educational programs:					
For the general public	1	1		-----	-----
For recipients of maternity services	---			----	------
For preschool and/or school children	1	1, 3	3	-----	------
For dentists and/or dental hygienists	1	--		---	------
For school teachers and/or teacher-training students	1	1, 3	3	----	------
Supervises and/or provides consultation service to local organizations	----	--	----	1	------
Distributes and/or administers grants-in-aid					
Subsidizes local dental services for children	--	--	------	-----	------
Subsidizes local dental services for adults	-	--	---	----	----
Operates a direct service program					
Makes dental surveys and/or special dental studies	1	----		-	-----
Operates dental clinics** for children	---	----	3	1	1
Includes the following services—					
Examination	----	-----	3	1	1
Prophylaxis	-----	---	3	1	1[e]
Emergency dentistry	-----	-	----	1	1
General dentistry	--	-	----	1	1
Finances dental care given children in private offices	--	1	-----	----	------
Includes the following services—					
Examination	-----	1	-----	-----	------
Prophylaxis	---	1[g]	----	----	------
Emergency dentistry	-----	1[g]	-----	-----	------
General dentistry	-----	1[e]	----	--	-----
Operates dental clinics** for adults	-----	--	------	1	1
Includes the following services—					
Examination	----	------	------	1	1
Prophylaxis	---	----	------	1	1
Emergency dentistry	-----	---	----	1	1
General dentistry	---		--	1	1
Finances dental care given adults in private offices	-	1[d], 2[e], [e]	----	-----	------
Includes the following services—					
Examination	-----	--	-----	------	------
Prophylaxis	------		-----	-----	------
Emergency dentistry	---	1[d], [g] 2[e], [e]	-----	-----	------
General dentistry	----		----	----	-----
Renders additional service not covered in this classification	----	--	------	-----	------

*Code
1 Health department
2 Department of welfare, social security, or public assistance
3. Department of education
4. State university or college
5. State hospital board

**Dental clinics, as recorded in this tabulation, include all group dental services—whether rendered through classroom visits, child health conferences, or formally organized dental clinics

[a] The department of health is really a bureau of public health subordinate to the department of health and welfare.

[b] The grant-in-aid is made to another State agency which renders direct service.

[c] As part of the general medical program.

[d] In connection with prenatal and/or postnatal services only.

[e] Not routinely, but occasionally; to a limited extent; upon request; in certain areas.

[f] Operated only as a demonstrational and/or educational project.

[g] For selected groups only.

Dental health education for the general public is disseminated in much the same manner as other branches of public health education: Through distribution of literature, lectures before community groups, motion pictures, radio talks, newspaper releases, and magazine articles. Education of children in habits and attitudes conducive to better dental health is rather more direct and concrete. Besides the use of exhibits, slides, models, and the like, dental health projects which require the actual participation of the individual child are initiated. Success of such activities requires the complete under-

standing and cooperation of the classroom teacher. Therefore, further educational activities are planned for teachers and teacher-training students. Talks to prenatal groups on dental changes during pregnancy and on diet and its relation to dental health are reported by about one-third of the State health departments. Finally, nearly 75 percent of the State health departments conduct institutes, arrange postgraduate refresher courses, or even finance intramural courses of postgraduate education for practicing dentists and dental hygienists in order that these professional groups may be kept informed of advances in their respective fields of service. Not all health departments attempt to reach all of the groups here listed, but some form of educational work which stresses importance of early and regular treatment characterizes practically every health department program of dental hygiene.

As already stated, only one-half of the State health departments directly operate dental service facilities. This does not mean, however, that sponsorship of dental service at public expense is restricted to this number. Promotion and supervision of local dental programs, as well as furnishing consultant service regarding them, are outstanding health department functions. Less than one-fourth of the State health departments allot financial subsidy to children's dental services administered locally. Such subsidy may be in the form of salaries, equipment, or materials. No attempt was made to trace State aid to its ultimate conversion into service. In other words, only direct State services are described in detail. Half of the health departments which subsidize local dental programs also operate service units at the State level. Selection of areas for establishment of either direct or subsidized dental services is frequently based upon the results of special dental surveys or preliminary studies made by the health department.

Dental services afforded children in schoolrooms and child-health conferences by dentists and dental hygienists of the State health department may be classified as examination, prophylaxis, emergency dentistry, and general dentistry. Examinations are made by all 27 of the health departments which render actual service. Most States include children of preschool age and all of the elementary grades in their examination program, but a few limit the groups to preschool children and those of the first three grades, to children 3 to 10 years of age, or to the first four elementary grades. There is less uniformity among the States in their plans for the other classes of service. Even when examination is available to all children present, prophylaxis and corrective services frequently are restricted either to the indigent, to certain age groups, to specified school grades—which vary from the kindergarten to the fourth grade—or to "those who need the service most." Still another system is that whereby the State neither does

prophylaxis nor makes corrections, but merely urges all children needing such services to secure them from private dentists of the community.

Usually the State services pictured here are supplied by one or more itinerant dentists or dental hygienists who spend as much time as possible in each community visited. A number of State health departments own healthmobiles or dental trailers, which are in reality complete dental offices on wheels, with the physical adjuncts necessary for rendering dental service. Such motorized clinic equipment contains a dental chair and instruments, laboratory facilities, sterilizer, and cabinets for instruments, linens, and supplies. In States which do not have mobile units of this type, the traveling health department dentists set up their portable equipment used for temporary clinics in a room of the school being served. Maintenance of stationary dental clinics by health departments is the exception rather than the rule. The District of Columbia is probably the most outstanding exception, with nine stationary clinics offering correctional service to children who are unable to pay for it, but this area resembles a city more than a State health jurisdiction.

Women attending prenatal or postnatal clinics represent the group of adults whose dental needs are given primary consideration by State health departments. Table 5 designates the eighteen agencies of this type which either directly or indirectly sponsor dental services for adults, most of whom are recipients of maternity services. While specific data were not gathered on quantity of service rendered, information supplied voluntarily suggests that in most instances the number of adults given corrective dentistry by health departments is very small.

Whereas correctional services appear to be somewhat overshadowed by educational activities in the dental programs of health departments, emphasis is reversed by the other agencies of State government which contribute toward the dental health of the public. In only three jurisdictions is the official State dental program entirely administered by an agency other than the health department. The Hawaiian department of education administers a children's dental program which includes both educational and service features. In New Hampshire the same agency subsidizes local dental services by supplying dental chairs and other equipment to schools. Louisiana's very extensive State program of dental care is a product of the State hospital board. Here, every type of dental service is offered for both adults and children who are unable to afford the needed care through private resources. Educational work is limited to personal oral hygiene instruction of each clinic patient.

All of the departments of welfare which touch in any way upon the subject of dental health (10) do so from the angle of arranging,

either directly, or indirectly by local subsidy, for remedial dentistry. For the most part, services furnished by the welfare department are confined to emergency dentistry for its clients, and represent one item of a broad medical care program instead of a separately organized service. Adults overbalance children as recipients of dental care from this source.

Dental clinics operated in connection with State university schools of dentistry include all forms of care from examination to reconstruction. While services offered in these clinics are not always entirely free to the patient, rates are considerably lower than those which obtain in private practice. Patients are usually selected on the basis of those having dental conditions which fill teaching needs.

In view of the foregoing observations, it is apparent that interest in the improvement of dental health is expressed by the State health department more often than by any other unit of State government, but that in some States health department functions are augmented by the services of other State agencies. As a rule, where more than one administrative body participates in dental services, there is little or no coordination of effort. Instead, each agency operates entirely independently of the other. According to the Iowa plan, however, dental programs of the health department and the State university are so closely interwoven that they function almost as one.

In conclusion, brief mention should be made also of the dental research which has been undertaken by several health departments and State universities. Specific problems covered by these research projects include: Studies of dental caries, oral manifestations of systemic disease, effect of controlled diets upon dental health, development of new restorative dental materials, and numerous aspects of preventive dentistry centered about children.

EXPENDITURES FOR MEDICAL AND DENTAL CARE

Fully two-thirds of the $285,715,800 expended for composite State health services [9] is charged to health programs which, primarily, are identified with maintenance of facilities for correction or care of mental and physical disabilities. Expressed otherwise, over 190½ million dollars are disbursed annually by agencies of State government for health activities in which medical or custodial care is the preponderant component. (See table 6.) This figure, it will be recalled, is exclusive of medical benefits paid through workmen's compensation channels and of expenditures for tuberculosis and venereal disease which also involve a considerable amount of medical care. Separate analyses of the cost of these particular services are made elsewhere because they represent problems of a peculiar nature and require special systems of administration.

[9] See text footnote * (Ch I)

TABLE 6.—*Approximate total and per capita annual expenditures* by all official State agencies for medical** and dental care in each State and Territory, the District of Columbia, and the Virgin Islands, and percentage distribution according to type of care.*

State or Territory	Approximate annual expenditure* for medical and dental care		Percent of reported total expenditure devoted to specific type of care			
	Total	Per capita	Psychiatric services	Services for crippled children	General and other allied special medical care	Dental service
Total	$190,653,400	$1.42	76.0	4.8	19.0	0.2
Alabama	1,320,100	47	87.0	13.0	(a)	(a)
Arizona	443,800	89	77.8	20.7	1.5	--------
Arkansas	1,382,200	71	65.6	9.5	24.4	.5
California	8,379,100	1.21	84.0	3.3	12.7	(a)
Colorado	2,532,800	2.26	53.5	3.8	42.7	(a)
Connecticut	3,457,200	2.02	87.0	3.9	9.1	(a)
Delaware	595,700	2.24	99.7	(a)	(a)	3
District of Columbia	1,304,000	2.06	2.0	1.3	96.7	(a)
Florida	1,790,100	94	92.2	7.3	(a)	.5
Georgia	1,694,300	54	87.4	9.6	2.5	.5
Idaho	366,100	70	100.0	(a)	(a)	--------
Illinois	14,528,200	1.80	65.3	4.1	30.3	.3
Indiana	6,172,900	1.80	84.7	2.5	12.8	(a)
Iowa	3,667,700	1.44	55.5	5.1	38.8	6
Kansas	2,145,600	1.19	65.7	12.2	21.9	.2
Kentucky	1,408,500	50	84.7	13.1	1.5	.7
Louisiana	4,456,600	1.88	32.1	2	67.7	(a)
Maine	1,332,100	1.57	81.7	5.3	12.1	.9
Maryland	2,396,400	1.32	49.1	4.4	46.1	.4
Massachusetts	9,281,800	2.15	75.9	4.2	19.9	(a)
Michigan	8,455,800	1.61	80.9	10.4	8.5	.2
Minnesota	4,261,300	1.53	66.1	6.8	27.0	1
Mississippi	1,219,900	56	59.1	5.9	33.9	1.1
Missouri	3,516,100	93	95.3	3.8	9	(a)
Montana	681,100	1.22	71.7	11.2	14.1	(a)
Nebraska	1,338,100	1.02	89.7	10.3	(a)	(a)
Nevada	90,500	82	93.0	2.2	(a)	4.8
New Hampshire	1,163,600	2.37	86.6	2.1	11.3	(a)
New Jersey	7,994,300	1.92	88.4	1.6	10.0	(a)
New Mexico	379,100	71	60.0	20.8	19.2	(a)
New York	35,952,200	2.67	95.5	2.9	1.6	(a)
North Carolina	1,692,800	47	81.2	12.5	(a)	6.3
North Dakota	1,270,400	1.98	75.1	5.6	19.3	(a)
Ohio	7,170,100	1.04	82.5	2.6	14.9	(b)
Oklahoma	2,545,600	1.09	56.8	17.4	22.3	5
Oregon	1,246,500	1.14	88.6	9.3	1.8	3
Pennsylvania	17,376,800	1.76	54.0	2.0	43.9	.1
Rhode Island	1,470,700	2.06	73.7	2.9	23.4	(a)
South Carolina	2,652,200	1.40	95.5	4.5	(a)	(a)
South Dakota	899,500	1.40	74.8	5.0	20.2	(a)
Tennessee	1,174,100	40	85.2	12.4	(a)	2.4
Texas	3,728,600	58	89.8	9.4	4	.4
Utah	570,400	1.04	84.6	11.6	2.3	1.5
Vermont	575,500	1.60	91.1	6.3	2.6	(a)
Virginia	3,691,800	1.38	62.7	3.8	31.9	1.6
Washington	2,156,300	1.24	95.4	4.6	(a)	(a)
West Virginia	1,707,000	90	43.5	11.2	45.3	(a)
Wisconsin	4,377,600	1.40	63.6	8.1	28.2	.1
Wyoming	270,900	1.08	80.4	10.0	9.6	(a)
Alaska	19,400	27		100.0	(a)	(a)
Hawaii	1,130,900	2.67	40.3	3.9	51.1	4.7
Puerto Rico	1,116,100	60	19.8	(a)	80.2	(a)
Virgin Islands	103,000	4.14	7.6	-	88.2	4.2

*Expenditures for the services considered represent index rather than absolute amounts. Because of variations in fiscal practices, figures cover the most recent year for which information was available at the date of interview. In some instances, because of overlapping and interweaving of activities, estimates were accepted in the absence of precise expenditure records. All funds disbursed by official State agencies for programs chiefly consisting of medical care are included irrespective of their source. State-appropriated moneys constitute 90 percent of the total; funds from local taxing bodies, 5 percent, fees from patients and private contributions, 3 percent; and Federal grants-in-aid, 2 percent.

**Insofar as they could be identified, figures for medical care include psychiatric services, services for crippled children, general medical care of the needy, cancer service, pneumonia service, prevention and correction of blindness, and health services for migratory labor.

[a] Expenditures for this service as a separate activity were not procurable, and therefore are not a part of the amount listed in the column, "Total."

[b] Less than one-tenth of 1 percent.

In table 6 are recorded not only the total and per capita expenditures of each State for all medical and dental care covered in this article, but also the relative costs of services conforming to the several classifications established. Services for crippled children have been extracted from general and other allied special medical care because these activities represent the only organized medical program for which a specific Federal fund is allotted to assist the States on a cooperative basis. Because of certain inherent deficiencies in the data, which will be explained later in this section of the report, expenditure figures represent the best approximations available and not absolute amounts. Therefore, it is urged that the reader regard both the aggregate expenditures and the percentage distributions thereof as indicative rather than precise measures of service.

According to the most complete information obtainable, individual disbursements of the 53 jurisdictions for all types of medical and dental care covered in the present article range from less than $20,000 to approximately $36,000,000, with per capita allotments for this purpose extending from $0.27 in Alaska to $4.14 in the Virgin Islands, which rank at the opposite terminus of the scale. Among the States proper, New York stands highest—with a per capita expenditure of $2.67—while Tennessee's report of $0.40 per capita places this State at the bottom of the list. For the country as a whole, the average per capita expenditure for medical care is $1.42, while the figure representing the median State stands at $1.24.

The rather extreme differences noted appear to be conditioned chiefly by a State's ability to purchase medical care. By arraying the States according to wealth, as measured by per capita income,[10] grouping them into quarters, and computing the median per capita expenditure for each quarter, the results obtained show forcibly that variations in expenditures are a direct outgrowth of the relative wealth of the States. The per capita expenditure for medical care by the State occupying the median position in each quarter is as follows: Highest quarter, $1.92; second quarter, $1.58; third quarter, $0.98; and lowest quarter, $0.64. Thus it is disclosed that the wealthiest quarter of States spend relatively three times the amount apportioned by the poorest quarter for medical care.

Location of a State in a particular geographic area may be regarded as another effective factor which contributes to the differences noted. Regions designated as Northeastern, Southern, Central, and Western—

[10] Martin, John L., National Income Division, Department of Commerce· Income Payments to Individuals by States, 1929–39. Survey of Current Business, October 1940

which have been established previously[11] for analysis of public health data—were selected for comparison of expenditures for State medical care in different sections of the United States. The Northeast leads in allocation of funds for health programs set up chiefly for provision of treatment facilities. In this group of States a median expenditure of $2.04 per capita is reported. Southern States offer a picture of marked contrast, since in this area the median expenditure is only $0.64. Ranking between the Northeastern and the Southern States are those of the West and the Central portion of the country. For these two areas median per capita expenditures are $1.42 and $1.08, respectively.

The fact that there is interrelationship between the factors of geographic position and State wealth must not be overlooked, of course. Nevertheless, the differences cited are believed to be sufficiently clear-cut in both instances to reflect true influence of the elements under consideration.

Financial support of State medical care for all types of physical and mental disabilities under consideration attains significant proportions in comparison with disbursements for other branches of public health activity. At the same time, the full import of medical and dental costs is not manifest until the expenditure for each major division of service is determined separately.

A rough break-down of the aggregate cost of medical care according to its constituent services points to a striking concentration of funds in one particular field. When the entire Nation is considered, hospitalization of mental disorders alone accounts for nearly 145 million dollars, or three-fourths of the sum recorded for all State health services which are characterized by the provision of medical care. An additional 1 percent of the total cost is allotted to mental hygiene facilities. In only 8 States do psychiatric services amount to less than all other types of medical and dental care combined, while in 9 States support of mental hospital facilities and care represents more than 90 percent of the sum devoted to all State medical and dental services. Thus it is apparent that in a number of instances State participation in activities involving medical care is limited chiefly to institutionalization of the mentally ill. The extent to which hospitalization of mental disorders dominates not only the medical care scene, but the complete

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[11] Mountin, Joseph W., Pennell, Elliott H., and Pearson, Kay: The distribution of hospitals and their financial support in Southern States. The Southern Medical Journal, vol. 33, No 4, April 1940. The established geographic areas with the States contained therein are as follows

Northeastern: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia.

Southern: Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas.

Central: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas

Western: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, and California.

realm of State health services becomes even more impressive when it is recognized that, for the country as a whole, States are spending more for the single item "care of the mentally handicapped" than for all remaining activities related to the promotion, conservation, and restoration of human health.

Ninety-three percent of the money expended for psychiatric services afforded by the various agencies of State government is drawn from the State treasuries, while local taxing bodies contribute 5 percent of the total amount. The remaining 2 percent is derived from patients' fees, institutional sales, or other miscellaneous sources.

State medical care for general and allied special conditions other than the crippling conditions of children ranks second to services for mental disorders, though there is a sharp decline in the respective costs of the two types of service. Expenditures for general medical care merged with special cancer and pneumonia services and with activities for the prevention and correction of blindness represent only 19 percent of the total medical care costs. It is to be expected that a relatively low fraction of the aggregate cost for State medical services should be charged to general and special conditions, for only a minor portion of such care provided at public expense is furnished by the State agency. By its very nature, the bulk of medical care for general and allied special conditions is a responsibility of local health and welfare units and of nonofficial organizations, from which no information was obtained for this survey.

At the same time, expenditures of State agencies for treatment of general and allied special conditions undoubtedly reach a somewhat larger total than is indicated in table 6. Due to the fact that financing of general medical care for the needy through the State's broad program of public assistance is a common practice, it frequently was necessary for the administrative agency to resort to estimation in reporting expenditures for medical care as such. In some instances—because of peculiarities in accounting systems—figures for the cost of medical care could not be isolated from other benefits allowable to clients of general relief programs. Thus the amount reported as being charged to general medical care is believed to be extremely conservative. Furthermore, some State university hospitals are so closely affiliated with the teaching unit of the medical school that no reliable separation of funds was possible. Another difficulty was encountered in arriving at an accurate figure for pneumonia control activities because of their association with general laboratory service. Still another item eluded strict accounting in States where cancer control is confined to educational measures which are covered in the expenses of central administration, adult hygiene, preventable disease control, or general public health education. Funds for correction and prevention of blindness, likewise, are combined frequently with the more

general aspects of State medical care of the needy. Accumulation of such circumstances tends somewhat to overemphasize the relative cost of psychiatric services and underemphasize that of general and special medical care. Nevertheless, the degree of deviation is not believed to be sufficient to alter appreciably the over-all picture.

Of the 36¼ million dollars expended for general and allied special medical care (exclusive of crippled children's services) almost the entire amount was charged to attendance for general conditions During the year preceding the survey, only 4 States, New York, Massachusetts, New Hampshire, and Georgia, allocated over $25,000 to cancer services Inasmuch as the Missouri program—also quite extensive—was just getting well under way, activities of this State are not reflected in the expenditure data collected From the standpoint of pneumonia services, only Illinois and Pennsylvania spent in excess of $25,000.

Health services involving general and allied special medical care are, for the most part, supported by appropriations from State legislative bodies. Eighty-seven percent of the total amount expended is derived from this source. Local political subdivisions reimburse the State governments for care afforded residents of the respective cities and counties to the extent of 4 percent of the total. Fees collected from full- or part-pay patients, private contributions, institutional sales, and the like, account for an additional 8 percent. Federal participation in State medical services for general and allied special conditions exclusive of the crippling conditions of children is negligible (1 percent of the total).

Services afforded by State agencies for alleviation of the crippling conditions of children cost upward of 9 million dollars. This sum represents essentially 5 percent of the cost of all State medical care. Organized crippled children's services are furnished by every State and Territorial jurisdiction except the Virgin Islands, and the amounts allocated to such programs range from $2,000 to over $1,000,000. Approximately one-third of the full expense of State services for crippled children is borne by the Federal Government. Inasmuch as only 5 percent is made up from local tax sources, and less than 1 percent is contributed by private philanthropic organizations, major support of the service rests upon the State.

Because State dental services are predominantly educational measures which are frequently interwoven with other health department functions such as general public health education or broad maternity-child health activities, less than one-half million dollars could be segregated as applying specifically to the cost of dental services. This is an infinitesimal portion of the total cost of programs covered by this discussion, when they are treated in combination. Three-fourths of such dental expenditures as could be isolated are supported in almost

equal proportions by the State and Federal Governments. The remaining quarter is composed primarily of contributions by private foundations and secondarily of allotments from local tax funds. Part of the Federal money utilized for State dental services is made available under title V, and part under title VI of the Social Security Act. Reference to the dental expenditures quoted in Public Health Bulletin No. 251 [12] denotes that a more detailed breakdown of figures was obtained for the 1938 study which featured dentistry only than for the survey herewith reported which includes numerous health activities.

DISCUSSION

Inequality of development typifies State organization for the several categories of medical service covered in this article. Psychiatric services outrank all other forms of medical care provided at State expense, irrespective of whether financial structure or volume of service is used as the criterion of measurement. Fifty-two of the fifty-three jurisdictions surveyed assume responsibility for institutionalizing patients with mental disorders, but scarcely more than half of them operate mental hygiene clinics. Moreover, considerable disparity exists in hospital admission procedures, in provisions for follow-up of paroled and discharged patients, and in the fiscal practices employed.

Nearly three-fourths of the States either directly operate or subsidize a plan for furnishing some measure of care for general medical or surgical conditions. However, there is relatively little direct State control over home and office care for the needy. Instead, where States participate in such service, they are apt to do it indirectly through extending financial aid to local political subdivisions for general public assistance. Except in extreme emergencies, care so financed is usually limited to that which can be obtained from a general practitioner in his office. Descriptive details of the medical care which is partially supported by State funds as an item of the broader general relief programs, or even records of the exact amount of money devoted to such services, are impossible to obtain in many States. Twenty-four jurisdictions operate general hospitals which accept needy patients free of charge or at a reduced fee.

In the main, State governments afford relatively uniform service for the treatment of crippled children. The influence of the Federal agency which makes a substantial financial contribution to the operation of State services for crippled children tends to standardize the content of such programs.

For the Nation as a whole, development of State programs for the treatment of cancer was in its infancy at the time this survey was

[12] See footnote 8.

made. Slightly more than one-third of the States either operated cancer diagnostic or treatment clinics or furnished free hospitalization for persons suffering from cancer. Even among several of these States, the cancer services reported were affiliated with the State's provisions for general medical care, and not operated as a specialized facility. During 1940 two preparations (serum and sulfonamide compounds) were in use for the treatment of pneumonia. About one-half of the States distributed free therapeutic serum and over one-third, sulfapyridine.

Dental programs of about half of the States at that time were limited to educational and promotional activities, while those of the other half included actual examination, prophylaxis, and/or corrective services for certain groups. For the most part, however, the service rendered for school children was largely for educational and demonstrational purposes, and that for adults was confined to clients of general relief or attendants of prenatal clinics.

Next to variation in the degree of development of the various branches of State medical and dental care, the extent to which responsibility for these services is dispersed among more than a dozen governmental units is probably the most noteworthy disclosure of this entire study. No matter whether all medical services within a single State or a single medical service within all States is the basis of consideration, there is marked division of authority. Health departments, departments of welfare, departments of education, departments of institutions, State university hospitals, independent State hospitals, State legislative bodies, and at least a half dozen special boards and commissions in varying degrees participate in providing some form of public medical care. Unfortunately, when several different agencies operate within a given area for any particular medical service, the organizational set-up frequently fosters independence of action rather than pooling of resources. Consequently, certain services are available from several sources, while no provision is made for others.

Disbursements by official agencies of State government for health activities considered in this section, namely, psychiatric services, services for crippled children, general and other allied special medical care, and dentistry, reach a total of over 190½ million dollars in the course of a year. This figure represents about two-thirds of the outlay for all forms of State health work. Insofar as general and allied special medical conditions are concerned, however, this allowance is not so great as it appears on the surface, for 75 percent of the cost of all State medical services incorporated in the present analysis is devoted to maintenance and operation of mental hospitals. Both the wealth of a State and its geographic location are influential factors in determining a State's per capita expenditure for medical care.

DEATHS DURING WEEK ENDED AUGUST 8, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug. 8, 1942	Corresponding week 1941
Data from 86 large cities of the United States:		
Total deaths	7,262	7,526
Average for 3 prior years	7,275	
Total deaths, first 31 weeks of year	262,338	266,469
Deaths per 1,000 population, first 31 weeks of year, annual rate	11.9	12.1
Deaths under 1 year of age	558	555
Average for 3 prior years	500	
Deaths under 1 year of age, first 31 weeks of year	17,322	16,233
Data from industrial insurance companies:		
Policies in force	64,941,222	64,409,728
Number of death claims	11,150	11,801
Death claims per 1,000 policies in force, annual rate	9.0	9.6
Death claims per 1,000 policies, first 31 weeks of year, annual rate	9.5	9.9

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED AUGUST 15, 1942

Summary

General health conditions continued favorable during the week as indicated by reports of important communicable diseases and the death rate in large cities. Although the number of cases of meningococcus meningitis reported during the week declined, from 65 to 47, the incidence continues somewhat above the 5-year (1937–41) median expectancy (32 cases) for the week. Of the current total, 17 cases were reported in the three Middle Atlantic States, as compared with only 5 cases for the same week last year. To date this year 2,354 cases have been reported for the country as a whole, more than the number reported for the corresponding period of any other year since 1937, when 4,120 cases were recorded.

The expected seasonal rise in the incidence of poliomyelitis continued, with 173 cases reported as compared with 128 for the preceding week. Both the current and the comulative figures to date, however, are below those for the corresponding periods of any other year since 1938. The following are the only States which reported more than 10 cases for the current week: Illinois 27, New Jersey 23, Tennessee 12, and New York 11. The current incidence is as high in the New England, Middle Atlantic and North Central States as in the South Atlantic and South Central areas.

A total of 164 cases of endemic typhus fever was reported for the week, the largest number for any week so far this year. Of this total, Texas reported 83 cases and Georgia 43. To date this year 1,667 cases have been reported as compared with 2,780 for the entire year 1941 and 1,879 in 1940. Of the total cases to date Texas has reported 579 and Georgia 472. The highest incidence of the disease usually occurs during the period July–November.

Other diseases reported during the current week include 1 case of anthrax in Texas, 30 cases of amebic dysentery, 389 cases of bacillary dysentery (278 in Texas), 273 cases of unspecified dysentery (239 in Virginia) 19 scattered cases of infectious encephalitis, 24 cases of Rocky Mountain spotted fever, 5 cases of smallpox, 24 cases of tularemia, and 218 cases of typhoid fever. The current incidence and the cumulative figures to date are the lowest on record for both smallpox and typhoid fever for those periods.

The death rate for the current week for 88 large cities in the United States is 10.1 per 1,000 population, as compared with 10.2 last week and a 3-year (1939–41) average of 10.0.

Telegraphic morbidity reports from State health officers for the week ended August 15, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Aug. 15, 1942	Aug. 16, 1941		Aug. 15, 1942	Aug. 16, 1941		Aug. 15, 1942	Aug. 16, 1941		Aug. 15, 1942	Aug. 16, 1941	
NEW ENG.												
Maine	0	0	0	------	------	------	12	31	5	1	1	0
New Hampshire	0	0	0	------	------	------	0	0	0	0	0	0
Vermont	0	0	0	------	------	------	32	24	10	0	0	0
Massachusetts	3	0	3	------	------	------	70	66	66	3	1	1
Rhode Island	0	0	0	------	------	------	4	6	6	0	0	0
Connecticut	0	1	1	1	------	------	9	22	15	1	0	0
MID. ATL.												
New York	7	11	11	[1] 1	[1] 3	[1] 4	101	134	134	9	5	3
New Jersey	1	2	4	5	2	2	42	45	45	6	0	0
Pennsylvania	2	3	9	------	------	------	32	91	91	2	0	2
E. NO. CEN.												
Ohio	0	2	3	4	2	5	32	35	35	1	1	1
Indiana	5	3	5	4	3	3	6	7	7	0	0	0
Illinois	13	7	13	2	------	2	16	27	27	1	0	1
Michigan [2]	1	4	6	1	2	------	48	39	60	2	0	0
Wisconsin	0	0	1	7	11	11	103	101	101	0	0	0
W. NO. CEN.												
Minnesota	0	1	1	------	------	1	9	2	6	0	0	0
Iowa	0	2	2	------	2	1	11	18	18	0	0	1
Missouri	3	10	5	1	------	------	3	17	4	0	0	0
North Dakota	0	0	2	3	6	3	6	16	2	0	0	0
South Dakota	1	1	1	------	------	------	2	1	2	0	0	0
Nebraska	0	0	0	2	------	------	16	0	0	0	0	0
Kansas	1	4	3	------	1	------	4	22	7	0	1	0
SO. ATL.												
Delaware	0	0	0	------	------	------	0	0	0	0	0	0
Maryland [2]	2	1	1	------	1	------	5	40	6	1	3	1
Dist. of Col.	0	1	2	------	2	------	1	6	5	0	0	0
Virginia	10	1	10	37	42	30	7	60	33	2	2	1
West Virginia	5	6	5	2	24	7	1	45	4	0	0	0
North Carolina	10	13	22	------	------	------	45	27	27	1	2	2
South Carolina	13	5	8	98	95	95	6	36	3	0	0	0
Georgia	9	12	12	21	7	------	5	29	4	1	0	0
Florida	2	0	2	1	2	1	8	8	2	0	1	0
E. SO. CEN.												
Kentucky	8	2	10	------	1	1	0	21	17	0	0	1
Tennessee	1	6	6	4	27	10	9	18	18	0	2	2
Alabama	7	9	11	17	11	11	0	7	4	3	0	0
Mississippi [2]	5	8	8	------	------	------	------	------	------	0	0	1
W. SO. CEN.												
Arkansas	7	4	7	14	------	7	4	36	4	1	0	0
Louisiana	2	7	7	4	------	7	7	1	4	4	2	0
Oklahoma	3	0	3	6	15	10	2	6	4	0	0	0
Texas	21	14	20	74	267	96	41	163	47	1	1	3
MOUNTAIN												
Montana	2	2	1	------	------	------	3	5	10	0	0	0
Idaho	0	0	0	------	------	------	3	3	2	0	0	0
Wyoming	0	1	1	5	------	------	7	5	4	1	0	0
Colorado	3	5	5	9	9	4	3	8	8	0	1	0
New Mexico	1	0	0	------	1	------	4	21	9	0	0	0
Arizona	1	1	1	25	9	9	10	12	4	0	0	0
Utah [2]	0	0	0	------	3	------	46	7	19	0	0	0
Nevada	0	0	------	------	------	------	2	0	------	0	0	------
PACIFIC												
Washington	1	1	1	2	------	------	80	4	12	1	1	0
Oregon	2	0	1	3	5	3	30	8	11	1	0	0
California	10	7	10	13	25	5	133	101	101	4	1	2
Total	157	157	297	366	578	362	1,020	1,376	1,111	47	25	32
32 weeks	7,241	7,312	11,696	80,391	489,306	159,592	465,780	822,777	347,849	2,354	1,386	1,386

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 15, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Aug. 15, 1942	Aug. 16, 1941		Aug. 15, 1942	Aug. 16, 1941		Aug. 15, 1942	Aug. 16, 1941		Aug. 15, 1942	Aug. 16, 1941	
NEW ENG.												
Maine	4	0	0	2	0	2	0	0	0	0	0	3
New Hampshire	2	0	0	5	2	1	0	0	0	1	1	0
Vermont	2	2	1	3	0	0	0	0	0	1	0	0
Massachusetts	1	11	4	71	40	20	0	0	0	7	10	2
Rhode Island	0	2	2	1	1	1	0	0	0	0	1	2
Connecticut	1	7	3	4	1	3	0	0	0	1	0	1
MID. ATL.												
New York	11	49	11	40	38	58	0	0	0	17	15	15
New Jersey	23	17	4	25	25	14	0	0	0	3	1	6
Pennsylvania	1	45	7	32	42	42	0	0	0	9	14	18
E. NO. CEN.												
Ohio	3	37	36	12	34	61	0	0	0	6	14	16
Indiana	7	5	5	10	6	22	0	1	1	9	7	7
Illinois	27	18	8	28	31	52	0	2	2	6	6	35
Michigan [2]	8	16	24	29	32	72	0	0	1	2	8	12
Wisconsin	2	5	3	27	28	30	0	1	0	[illegible]	0	1
W. NO. CEN.												
Minnesota	7	14	5	21	10	18	0	0	0	0	1	1
Iowa	3	5	5	13	9	9	0	1	2	0	4	4
Missouri	4	4	4	23	8	13	1	4	4	6	22	16
North Dakota	1	0	1	3	1	4	0	0	0	0	0	0
South Dakota	0	0	0	3	2	5	0	0	0	0	0	0
Nebraska	0	0	2	0	1	1	0	0	0	0	0	1
Kansas	1	1	6	18	12	21	0	0	0	2	2	4
SO. ATL.												
Delaware	0	2	0	1	0	1	0	0	0	0	0	2
Maryland [3]	2	16	1	6	7	8	0	0	0	2	4	12
Dist. of Col.	1	8	1	3	7	4	0	0	0	1	0	2
Virginia	3	7	4	11	15	8	0	0	0	9	8	17
West Virginia	4	1	1	14	13	13	0	0	0	5	11	22
North Carolina	5	16	6	24	16	25	0	0	0	8	13	13
South Carolina	2	11	2	4	4	4	0	2	0	4	20	15
Georgia	1	69	1	7	6	6	0	0	0	5	11	26
Florida	2	10	2	6	0	1	0	0	0	11	1	1
E. SO. CEN.												
Kentucky	6	15	6	15	7	17	0	0	0	22	23	43
Tennessee	12	37	1	9	7	14	1	1	1	10	13	28
Alabama	2	82	3	8	12	12	0	0	0	9	2	13
Mississippi [3]	2	11	2	4	4	3	0	0	0	3	23	13
W. SO. CEN.												
Arkansas	6	4	2	5	2	8	0	0	0	19	14	20
Louisiana	2	3	3	1	3	5	0	0	0	7	15	19
Oklahoma	1	0	2	6	3	6	0	0	0	2	9	21
Texas	2	2	2	22	18	18	0	0	0	20	32	75
MOUNTAIN												
Montana	1	1	1	5	10	6	0	0	0	0	0	1
Idaho	0	0	0	1	3	1	0	0	0	0	1	1
Wyoming	1	1	0	1	0	0	0	0	0	0	0	0
Colorado	1	0	1	7	2	10	0	0	0	1	3	2
New Mexico	0	0	1	1	3	3	3	0	0	2	10	6
Arizona	3	0	0	[4] 1	0	1	0	0	0	0	2	1
Utah [2]	0	3	1	1	2	5	0	0	0	0	0	1
Nevada	0	0	------	0	0	------	0	0	------	0	0	------
PACIFIC												
Washington	0	4	0	4	18	8	0	0	0	0	3	3
Oregon	0	3	1	5	4	5	0	9	0	1	5	3
California	6	5	23	36	44	44	0	0	3	6	9	8
Total	173	549	391	578	533	759	5	12	22	218	338	506
32 weeks	1,322	2,784	2,029	88,532	89,172	115,792	609	1,150	7,914	[3] 3,813	4,457	6,602

See footnotes at end of table.

Teleghapic morbidity reports from State health officers for the week ended August 15, 1942—Continued

Division and State	Whooping cough, Week ended— Aug. 15, 1942	Whooping cough, Week ended— Aug. 16, 1941	Week ended Aug. 15, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	38	18	0	0	0	0	0	0	0	0	0
New Hampshire	3	0	0	0	0	0	0	0	0	0	0
Vermont	40	0	0	0	0	0	0	0	0	0	0
Massachusetts	165	148	0	0	1	0	0	0	0	0	0
Rhode Island	13	13	0	0	0	0	0	0	0	0	0
Connecticut	36	20	0	0	1	0	0	0	0	0	0
MID. ATL.											
New York	361	214	0	0	13	0	4	0	3	0	0
New Jersey	234	124	0	1	0	0	0	0	0	0	0
Pennsylvania	230	178	0	0	1	0	1	0	0	0	0
E. NO. CEN.											
Ohio	115	247	0	0	0	2	1	0	4	2	0
Indiana	51	15	0	0	0	0	0	0	0	1	0
Illinois	298	181	0	1	34	0	2	0	0	1	0
Michigan [2]	264	242	0	2	2	0	0	0	0	0	0
Wisconsin	220	214	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	51	52	0	4	0	0	0	0	0	0	0
Iowa	55	60	0	1	1	0	3	0	2	1	0
Missouri	4	35	0	0	0	2	0	0	0	0	0
North Dakota	13	22	0	0	0	0	2	0	1	0	0
South Dakota	4	5	0	0	0	0	0	0	0	0	0
Nebraska	2	8	0	0	0	0	0	0	0	0	0
Kansas	23	84	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	3	4	0	0	0	0	0	0	0	0	0
Maryland [2]	31	56	0	0	0	7	1	0	4	0	0
Dist. of Col.	12	9	0	0	0	0	0	0	0	0	0
Virginia	31	38	0	0	0	239	0	0	3	1	0
West Virginia	14	29	0	0	0	0	0	0	0	0	0
North Carolina	145	203	0	0	0	0	0	0	1	0	6
South Carolina	31	74	0	0	0	0	0	0	0	0	6
Georgia	7	19	0	0	4	0	0	0	0	1	43
Florida	6	3	0	0	2	0	0	0	0	1	15
E. SO. CEN.											
Kentucky	29	46	0	0	4	0	0	0	0	0	0
Tennessee	75	67	0	0	0	6	0	0	1	2	2
Alabama	22	14	0	0	0	0	0	0	0	1	3
Mississippi [2]	-----	-----	0	0	0	0	0	0	0	0	1
W. SO. CEN.											
Arkansas	14	22	0	7	37	0	0	0	0	2	0
Louisiana	0	11	0	0	3	0	0	0	0	0	4
Oklahoma	15	18	0	0	0	0	0	0	0	0	0
Texas	111	92	1	11	278	0	1	0	0	5	83
MOUNTAIN											
Montana	21	23	0	0	0	0	0	0	1	2	0
Idaho	2	8	0	0	0	0	0	0	0	0	0
Wyoming	4	24	0	0	0	0	0	0	0	0	0
Colorado	20	109	0	0	0	0	1	0	2	2	0
New Mexico	4	50	0	1	1	0	0	0	1	0	0
Arizona	[4] 11	33	0	0	0	17	0	0	0	0	0
Utah [2]	22	56	0	0	0	0	0	0	0	1	0
Nevada	3	1	0	0	0	0	0	0	0	1	0
PACIFIC											
Washington	31	86	0	0	0	0	2	0	0	0	0
Oregon	32	22	0	0	0	0	0	0	0	0	0
California	123	332	0	2	7	0	1	0	1	0	1
Total	3,039	3,329	1	30	389	273	19	0	24	24	164
32 weeks	119,319	143,300									

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] A corrected report shows 3 cases of typhoid in New Mexico for the week ended July 25 instead of 33 fever cases published through an error in transmission.
[4] Delayed report.

WEEKLY REPORTS FROM CITIES

City reports for week ended August 1, 1942

This table lists the reports from 88 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	------	0	0	0	0	0	2	0	0	4
Baltimore, Md	0	0	1	0	4	3	9	0	6	0	2	42
Billings, Mont	0	0	------	0	2	0	0	0	0	0	0	3
Birmingham, Ala	0	0	------	0	0	0	2	0	2	0	1	2
Boise, Idaho	0	0	------	0	0	0	0	0	0	0	0	0
Boston, Mass	1	0	------	0	37	0	8	0	8	0	0	48
Bridgeport, Conn	0	0	------	0	0	0	1	0	0	0	0	2
Brunswick, Ga	0	0	------	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	------	0	2	0	4	0	1	0	0	25
Camden, N. J	0	0	------	0	0	0	2	0	0	0	0	4
Charleston, S. C	0	0	------	0	1	0	4	2	1	0	0	1
Charleston, W. Va	0	0	------	0	0	0	0	1	0	0	0	0
Chicago, Ill	3	0	2	0	8	0	12	2	18	0	3	207
Cincinnati, Ohio	1	0	------	0	2	0	2	2	4	0	0	6
Cleveland, Ohio	2	0	9	0	0	1	7	2	3	0	1	57
Columbus, Ohio	0	0	------	0	1	0	1	0	5	[illegible]	0	19
Concord, N. H	0	0	------	0	0	0	0	0	0	0	0	0
Cumberland, Md	0	0	------	0	0	0	2	0	0	0	0	0
Dallas, Texas	3	0	------	0	1	0	2	0	1	0	1	7
Denver, Colo	2	0	2	0	10	0	2	0	4	0	0	21
Detroit, Mich	0	0	1	0	6	0	6	4	12	0	0	113
Duluth, Minn	0	0	------	0	1	0	2	0	2	0	0	5
Fall River, Mass	3	0	------	0	3	1	2	0	3	0	0	2
Fargo, N. Dak	0	0	------	0	1	0	0	0	0	0	0	0
Flint, Mich	0	0	------	0	0	0	1	0	1	0	0	5
Fort Wayne, Ind	0	0	------	0	1	0	3	0	0	0	0	0
Frederick, Md	0	0	------	0	0	0	1	0	0	0	0	0
Galveston, Tex	0	0	------	0	0	0	1	0	0	0	0	6
Grand Rapids, Mich	0	0	------	0	0	0	0	0	1	0	0	7
Great Falls, Mont	0	0	------	0	3	0	1	0	1	0	0	0
Hartford, Conn	1	0	------	0	5	1	0	2	0	0	0	32
Helena, Mont	0	0	------	0	0	0	0	0	0	0	0	0
Houston, Tex	0	0	------	0	4	0	12	0	0	0	2	4
Indianapolis, Ind	1	1	------	0	0	0	7	2	1	0	0	28
Kansas City, Mo	0	0	------	0	3	0	3	0	3	0	0	1
Kenosha, Wis	0	0	------	0	0	0	0	0	1	0	0	10
Little Rock, Ark	0	0	1	0	0	0	1	0	0	0	0	0
Los Angeles, Calif	3	0	2	0	27	3	6	0	4	0	0	21
Lynchburg, Va	1	0	------	0	0	0	1	0	0	0	0	7
Memphis, Tenn	0	0	------	0	8	0	1	7	0	0	0	12
Milwaukee, Wis	0	0	------	0	80	0	0	1	4	0	0	60
Minneapolis, Minn	0	0	------	0	1	0	1	0	1	0	0	4
Missoula, Mont	0	0	------	0	0	0	0	0	0	0	0	0
Mobile, Ala	0	0	1	0	0	0	1	0	1	0	0	0
Nashville, Tenn	1	0	------	0	0	0	2	4	0	0	0	1
Newark, N. J	0	0	------	0	9	1	1	1	1	0	2	47
New Haven, Conn	0	0	------	0	0	0	0	0	2	0	0	5
New Orleans, La	0	0	1	0	4	1	7	1	1	0	0	0
New York, N. Y	8	0	4	0	25	10	30	3	24	0	5	160
Omaha, Nebr	0	0	------	0	1	0	0	0	1	0	0	4
Philadelphia, Pa	0	0	------	0	7	0	15	0	25	0	0	109
Pittsburgh, Pa	1	0	------	0	1	1	4	0	4	0	0	18
Portland, Maine	0	0	------	0	10	3	1	0	1	0	0	12
Providence, R. I	1	0	------	0	18	0	3	0	0	0	0	11
Pueblo, Colo	0	0	------	0	4	0	1	0	0	0	0	0
Racine, Wis	0	0	------	0	8	0	0	0	3	0	0	21
Raleigh, N. C	0	0	------	0	1	0	3	0	0	0	1	2
Reading, Pa	0	0	------	0	0	0	2	0	0	0	0	9
Richmond, Va	0	0	------	0	3	0	0	0	1	0	0	2

City reports for week ended August 1, 1942

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Roanoke, Va	0	0	------	0	1	0	0	0	0	0	0	0
Rochester, N. Y	0	0	------	0	4	0	0	0	2	0	0	7
Sacramento, Calif	2	0	----	0	4	0	1	0	7	0	0	3
Saint Joseph, Mo	0	0	-	0	0	0	3	0	2	0	0	0
Saint Louis, Mo	0	0	6	0	2	0	8	2	1	1	0	6
Saint Paul, Minn	0	0	----	0	6	0	7	0	1	0	0	33
Salt Lake City, Utah	0	0		1	35	0	0	0	2	0	0	10
San Antonio, Tex	0	0	1	0	4	0	1	0	1	0	0	0
San Francisco, Calif	0	0	1	0	39	0	7	0	2	0	1	9
Savannah, Ga	0	0	-	0	0	0	2	0	0	0	2	0
Seattle, Wash	0	0	---	0	41	0	4	0	0	0	0	13
Shreveport, La	0	0	----	0	0	0	0	2	0	0	1	0
South Bend, Ind	0	0	----	0	1	0	0	0	0	0	0	5
Spokane, Wash	0	0	----	0	7	0	3	0	0	0	0	10
Springfield, Ill	0	0	----	0	0	0	1	0	2	0	0	17
Springfield, Mass	0	0	----	0	14	0	0	0	2	0	0	1
Superior, Wis	0	0	---	0	1	0	0	0	0	0	0	0
Syracuse, N. Y	0	0		0	21	0	3	0	0	0	1	31
Tacoma, Wash	0	0	-	0	16	1	0	0	0	0	0	3
Tampa, Fla	0	0	-	0	0	0	0	0	0	0	0	0
Topeka, Kans	0	0		0	3	0	0	0	5	0	0	4
Trenton, N. J	0	0	1	1	0	0	2	0	0	0	0	2
Washington, D. C	0	0		0	2	0	5	0	6	0	0	12
Wheeling, W. Va	0	0	-	0	0	0	0	0	0	0	0	9
Wichita, Kans	0	0	---	0	0	0	3	0	1	0	0	13
Wilmington, Del	0	0	----	0	0	0	3	0	0	0	0	2
Wilmington, N. C	0	0	----	0	0	0	4	0	0	0	0	42
Winston-Salem, N. C	0	0	---	0	0	0	0	0	0	0	0	0
Worcester, Mass	0	0	--	0	0	1	4	0	1	0	0	44

Dysentery, amebic.—Cases. Baltimore, 2; New York, 1, San Francisco, 2.

Dysentery, bacillary.—Cases. Baltimore, 3; Cleveland, 1; Detroit, 2; Los Angeles, 3; Nashville, 2; New York, 12; Philadelphia, 1; Richmond, 4; San Francisco, 1.

Leprosy.—Cases· New Orleans, 1.

Rocky Mountain spotted fever.—Cases: Birmingham, 1; St. Louis, 1.

Typhus fever.—Cases· Charleston, S. C., 5; Galveston, 1; Houston, 3, New York, 2, Savannah, 1.

Rates (annual basis) per 100,000 population, for the group of 88 cities in the preceding table (estimated population, 1942, 34,060,596)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Aug. 1, 1942	5.21	5 05	0.31	76 24	36 44	28 78	0 15	3.52	220.75
Average for week 1937–41	9.90	4 02	1.55	[1] 102.12	39 92	39.76	0 62	8.05	221 72

[1] Median.

PLAGUE INFECTION IN BEAVERHEAD COUNTY, MONTANA

Plague infection has been reported proved in 2 specimens from ground squirrels (*C. columbianus*) collected in Beaverhead County, Montana, as follows: July 14, in a pool of 17 fleas and 5 ticks from 25 ground squirrels taken 15 miles northwest of Wisdom, on the north

fork of the Bighole River; July 15, in tissue from 1 ground squirrel taken 3 miles northwest of Bighole Battlefield, on Trail Creek.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—During the week ended July 25, 1942, 2 rats found in Honokaa, Paauhau area, Hamakua District, Island of Hawaii, were proved positive for plague.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended July 18, 1942.—During the week ended July 18, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		3	2	3	8				1	17
Chickenpox		2	3	27	72	26	3	10	42	185
Diphtheria		10		32	2	2	2	1	1	50
Dysentery				22						22
German measles				1	9	1			10	21
Influenza									1	1
Lethargic encephalitis						1				1
Measles		3		82	120	25	19	10	11	270
Mumps		20	1	11	118	11	37	6	187	391
Pneumonia					6				2	8
Poliomyelitis		3	1	2	2					8
Scarlet fever	1	4	2	45	79	15	13	18	19	196
Tuberculosis	2	9	7	122	70		14		46	270
Typhoid and paratyphoid fever		1	1	14	4				1	21
Undulant fever				1	2					3
Whooping cough		10	2	132	48	6		7	30	235
Other communicable diseases				2	242	29			3	276

SWITZERLAND

Notifiable diseases—March 1942.—During the month of March 1942, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	24	Paratyphoid fever	15
Chickenpox	149	Poliomyelitis	5
Diphtheria	141	Scarlet fever	199
Epidemic encephalitis	1	Trachoma	1
German measles	94	Tuberculosis	324
Influenza	497	Typhoid fever	11
Measles	780	Undulant fever	13
Mumps	213	Whooping cough	71

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Typhus Fever

Algeria.—During the period July 1–10, 1942, 742 cases of typhus fever were reported in Algeria.

Morocco.—During the week ended July 25, 1942, 250 cases of typhus fever were reported in Morocco.

Rumania.—During the week ended August 1, 1942, 13 cases of typhus fever were reported in Rumania.

Spain.—During the week ended July 11, 1942, 7 cases of typhus fever were reported in Spain.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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DIVISION OF SANITARY REPORTS AND STATISTICS

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Public Health Reports

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EVALUATING DENTAL HEALTH PROGRAMS [1]

By John W. Knutson, *Passed Assistant Dental Surgeon, United States Public Health Service*

The number of dental units operating in State departments or boards of health and the number of dental programs operating in the political subdivisions of States have increased markedly in this country during the past 5 years (*1*, *2*). This activity in the promotion of dental health has stimulated interest in and study of the development of methods for evaluating the various administrative set-ups under which these dental programs function. A result of this study has been the proposal of numerous evaluation techniques (*3*, *4*, *5*, *6*, *7*). The apparent limitations of each of these techniques for the complete appraisal of a dental program, however, have given rise to considerable discussion as to their relative merits as measuring devices (*6*, *8*, *9*). Inasmuch as these limitations are measured on the basis of a mythical over-all yardstick, it would appear that a recognition of the individual worth of the several techniques, each of which evaluates the accomplishments of a separate phase of a dental program, might result in a very useful combination of techniques.

This paper is concerned with the presentation and interpretation of data collected for the purpose of appraising the dental program of a small urban community. Various methods are employed in comparing the findings in this community with similar findings in a nearby urban center which had not had an organized dental program up to the time these data were collected. Thus, through the application of different measures to the same material, a means is afforded for studying the relative usefulness of each device in measuring the attainment of the objectives of the program.

A necessary prerequisite to the evaluation of a dental program, therefore, is a definition of its objectives. This definition should be arrived at after a detailed examination of the known facts regarding the hazards to dental health and what can be done to eliminate or reduce those hazards. The chief hazard to dental health in children, for example, is dental caries. The usual clinical sequence of this

[1] From the Division of Public Health Methods, National Institute of Health.

disease and its degenerative sequelae are as follows: The tooth is attacked by caries; the caries progresses to pulp involvement; then acute toothache may result in immediate extraction of the tooth or an infected pulp may result in the formation of an apical abscess and the establishment of a focus of infection, loss of the tooth, shifting of the remaining teeth, malocclusion, loss of intermaxillary space, collapse of the oral structures, maldevelopment, facial deformity, and malfunction. The maldevelopment and malfunction thus resulting may effect varying degrees of interference with such normal physiologic functions of the oral and contiguous structures as mastication, swallowing, speech, hearing, and respiration. Furthermore, malocclusion and malfunction are important precursors of the condition known as pyorrhea, which is the major cause of loss of teeth in adults. Preventing this disease or interrupting its sequence at the earliest possible stage is the principal objective of a dental program for children.

Inasmuch as the etiology of dental caries is unknown, prevention of the disease causing this degenerative sequence is still in the experimental stage. It is an established fact, however, that the treatment of early carious lesions by the proper placement of chemically and physically stable filling materials will prevent or delay the extension of caries to pulp involvement and tooth death. A primary purpose of dental health programs becomes, therefore, the exercise of procedures whereby the early detection and filling of carious teeth is accomplished and tooth loss is thereby prevented or indefinitely postponed.

Although the purpose of a dental program can thus be precisely and objectively stated, the administration of such a program cannot be limited to the performance of those functions which produce impersonal statistics showing the immediate accomplishment of that purpose. The permanency of any health program requires that its operative procedures meet with public approval, that the expenditure of public funds and of personnel time be properly accounted for, and that a demand for its continuation be sustained by an informed and actively interested public. This perspective on the administrative aspects of dental programs suggests that some clarification of the issues involved might result from an attempt to classify evaluation techniques into four major categories according to the characteristic to be measured: First, volume of administrative activity; second, public response to a unit volume of administrative activity; third, volume of clinical dental service dispensed; and fourth, the effect of a given program on dental health.

The first category would include those methods which attempt to evaluate the efficiency of the administrative organization in producing activities designed to promote dental health. Numerical data on circulars and pamphlets prepared and issued, radio and other talks

given, children examined, new local programs initiated, and refresher courses on children's dentistry conducted are usually considered routine recordings necessary to the justification of funds and personnel time expended. A determination of the unit cost of each activity should produce figures which afford a comparison of current costs with those of previous years, a comparison of the relative cost of each activity, and a comparison of these figures with similar ones from other organizations.

Evaluation techniques included in the second category—those concerned with measuring public response to administrative procedures—might give information such as number of children acquiring 100-percent correction cards,[3] attendance at lectures on dental subjects, requests for dental talks, attendance at dental clinics, requests for dental inspection service, and financial support and other evidences of interest by individuals or local civic organizations. Comparing these data to those of previous periods would indicate relative progress in obtaining public response. A comparison of response and administrative cost should furnish an evaluation on a cost basis of the various methods of eliciting public response.

Data on volume of clinical dental service are included in the third category of evaluation techniques. A direct measure of the amounts and kinds of dental service dispensed could be obtained from detailed clinical records of the population exposed to a program, if such records were available. However, since dental fillings are cumulative with age, an indirect measure of the volume of this type of service acquired by a population may be obtained through survey methods in which direct counts of filled teeth are made. Further, the annual rate at which teeth are being filled may be estimated as the sum of the annual increments obtained from age specific prevalence rates of filled teeth (*10*). The ratio of filled to carious (decayed, missing, or filled) teeth affords a good indication of the completeness of dental service.

The fourth category of evaluation techniques includes devices for quantitating the status of dental health in a community at a given time. These may be subdivided into direct and indirect methods. Direct methods attempt to measure dental health in terms of oral hygiene, a qualitative term dependent for its grading on a general over-all interpretation of such factors as oral cleanliness, prevalence of dental caries, care of defects as indicated by the ratio of filled to carious teeth, and condition of the saliva and gums. The indirect methods, on the other hand, attempt to measure quantitatively the evidences of dental ill health. Since dental caries is responsible for most dental ill health in children, and since, in the absence of dental

[3] Periodically each child is given a dental inspection notification card The returned card, bearing a dentist's signature as evidence that needed dental treatment has been administered, becomes known as a 100-percent correction card.

treatment, the expected end for a tooth attacked by this disease is death of the tooth, various forms of accumulated tooth mortality rates have been suggested for measuring the effect of a given program on the number of deaths in a tooth population. This method represents an attempt to employ a technique which has demonstrated its usefulness in evaluating other specialized health programs.

The foregoing discussion has been concerned chiefly with an attempt to classify methods of evaluating dental programs according to their apparent function. This classification has been suggested on the assumption that the limitations of any single method do not necessarily preclude its usefulness, but may enhance its qualifications for measuring a particular phase of a dental program. The primary purpose of this paper in presenting the methods used to evaluate a specific dental program, that of Waynesboro, Pa., is not to render an authoritative report of the value of this particular program but rather to study the methodology of evaluation procedures.

MATERIAL AND METHODS

In the spring of 1939, the United States Public Health Service conducted an evaluation study of the dental program in the elementary schools of Waynesboro, Pa., an urban center of approximately 10,000 inhabitants located near the south central border of the State. A dental health program organized in Waynesboro in 1931 had been functioning continuously since that time. The administrative personnel consisted solely of a dental hygienist whose duties were limited by definition to annual examination of the teeth of each child in the first six grades, the performance of dental prophylaxis when indicated, and the preparation of individual cards notifying parents of a child's need for professional dental services. This notification card became known as a 100-percent correction card if and when it was returned to the dental hygienist bearing a dentist's signature as evidence that all dental defects had been corrected.

In an attempt to motivate group action for the correction of dental defects, a gold star was awarded to each classroom in which the entire enrollment had obtained 100-percent corrections. Additional incentive was provided during the last 3 years of the program by the manager of the local theater, who offered a free admission to all children obtaining 100-percent correction cards. An annual dental tag day and contributions by local social and civic organizations provided a yearly fund of approximately $250 which was used to provide some dental services for indigent children.

In order to conserve examination time and to facilitate the analysis of the resulting data, the dental examinations made for this study were limited to observations on the first permanent molars. This procedure was based on the assumption that a relatively accurate measure of the

dental condition of the permanent teeth of grade school children may be obtained from data on first molars alone. Evidence supporting this assumption is provided by an analysis (*11*) of data resulting from complete dental examinations of the entire grade school population of Hagerstown, Md. This analysis indicated that first molars alone contributed the following proportions of all defects found in the permanent teeth: 69 percent of all carious teeth, 78 percent of all carious tooth surfaces, 95 percent of all missing teeth (extracted plus remaining roots), and no less than 90 percent of all missing teeth in any one age group from 6 through 15 years.

In the present study this abbreviated dental examination was made on each child in the grade school population of Waynesboro. At the time of the examination, the condition of each first permanent molar or tooth space was recorded, each tooth being classified under one or more of the following categories: Free from disease, carious, filled, hypoplastic, unerupted, missing (extracted), or indicated for extraction. A tooth was classed as indicated for extraction when only roots remained, when the carious process obviously involved the pulp, or when in the judgment of the examiner the caries appeared so extensive that its mechanical removal would necessarily involve the pulp.

Similar dental examinations were made on the white children in the fifth, sixth, seventh, and eighth grades of the elementary schools of Hagerstown, Md., a city of approximately 30,000 population, to provide data on the characteristics of dental caries in the first permanent molars of children in a community which had not had an organized dental health program. A detailed description of Hagerstown, which is 12 miles southwest of Waynesboro, has been presented in a previous publication (*10*). With reference to such characteristics as nativity of population, industries, and socio-economic status, these two cities present no marked contrasts.

In general, the findings in first permanent molars will be presented in the form of age and sex specific prevalence rates per 100 children. Since the dental examinations made on the children in the fifth through the eighth grades of Hagerstown provided age specific findings for the age groups 10 to 14 years, inclusive, only the dental findings for these same age groups will be presented for the Waynesboro children. The desirability of providing a single figure to summarize quantitatively a particular dental finding for all ages is met in this presentation by determining the average rate for all ages. This is merely a numerical average of the age specific rates, and because these rates are expressed per 100 children, this average is equivalent to an adjusted rate on a standard population consisting of 100 children in each age group. Since dental defects accumulate with age, the value of an average per child over all ages, which is the summary figure usually presented, may be greatly influenced by the relative number of children in each

age group. This consideration may be of no great importance when dealing with periodic findings in a single city over a short span of years. However, this study is largely concerned with the comparison of dental findings in children of two cities. Therefore an adjusted rate on a standard population is employed to eliminate differences in the respective summary figures which might be due to differences in age distribution alone.

FINDINGS

The Waynesboro dental program operated in all eight grades of the elementary schools during the first 5 of its 8 years of existence, but was restricted to the lower six grades during the last 3 years. Therefore the enrollment in all eight grades for each of the first 5 years and the enrollment in the lower six grades for each of the last 3 years represents the number of children exposed to the program for each specified school year. The number of children who were subject to the direct influence of the program and the number and proportion of these children who received a dental examination are presented for each school year, 1931–32 through 1938–39, in table 1. These data indicate that in each of the first 5 years there was an appreciable increase over the previous year in the percentage of children receiving a dental examination, the proportion rising from 65.5 percent in 1931–32 to 96.5 percent in 1935–36. During each of the last 3 years 100 percent of the children enrolled in the lower six grades were examined.

TABLE 1.—*Number of children enrolled,*[1] *number and percentage receiving dental examination, and number and percentage of those examined who acquired 100-percent correction cards, by school year, Waynesboro elementary school children*

School year	1931–32	1932–33	1933–34	1934–35	1935–36	1936–37	1937–38	1938–39
Number of children enrolled	1,634	1,621	1,598	1,522	1,489	1,037	1,018	980
Number of children receiving dental examination	1,070	1,196	1,418	1,423	1,436	1,037	1,018	980
Percentage of enrollment examined	65.5	73.8	88.7	93.6	96.5	100.0	100.0	100.0
Number of children receiving 100-percent correction cards	259	253	457	504	690	803	851	861
Percentage of those examined who received 100-percent correction cards	24.2	21.2	32.2	35.4	48.0	77.4	83.6	87.8

[1] Includes children in all 8 grades for school years 1931–32 through 1935–36 and children in first 6 grades for school years 1936–37 to 1938–39, inclusive.

TABLE 2.—*Number of children, number of first permanent molars decayed or missing or filled, extracted, indicated for extraction, extracted or extraction indicated, and filled, and rates per 100 children, by age and sex, for 700 Waynesboro children*

	347 boys						353 girls					
Age last birthday	10	11	12	13	14	Adjusted rate	10	11	12	13	14	Adjusted rate
Number of children	69	79	76	77	46	------	78	78	79	77	41	------
Number of first molars decayed, missing, or filled	191	249	217	244	146	------	220	238	235	254	127	------
Number decayed, missing, or filled per 100 children	276.8	315.2	285.5	316.9	317.4	302.4	282.0	305.1	297.5	329.9	309.8	304.9
Number of first molars extracted	17	44	49	6[illegible]	55	------	27	35	54	69	51	------
Number extracted per 100 children	24.6	55.7	64.5	80.5	119.6	68.9	34.6	44.9	68.4	89.6	124.4	72.4
Number of first molar extractions indicated	2	3	1	8		------	3	4	6	2	3	------
Number of extractions indicated per 100 children	2.9	3.8	1.3	10.4	10.9	5.9	3.8	5.1	7.6	2.6	7.3	5.3
Number of first molars extracted or extraction indicated	19	47	50	70	60	------	30	39	60	71	54	------
First molar mortality rate, per 100 children	27.5	59.5	65.8	90.9	130.4	74.8	38.5	50.0	75.9	92.2	131.7	77.7
Number of first molars filled	112	164	116	126	49	------	142	169	144	139	57	------
Number filled per 100 children	162.3	207.6	152.6	163.6	106.5	158.5	182.1	216.7	182.3	180.5	139.0	180.1

TABLE 3.—*Number of children, number of first permanent molars decayed or missing or filled, extracted, indicated for extraction, extracted or extraction indicated, and filled, and rates per 100 children by age and sex, for 1,915 Hagerstown children*

	923 boys						992 girls					
Age last birthday	10	11	12	13	14	Adjusted rate	10	11	12	13	14	Adjusted rate
Number of children	66	176	223	261	197	------	82	201	244	297	168	------
Number of first molars decayed, missing, or filled	174	500	684	762	598	------	229	599	764	899	524	------
Number decayed, missing, or filled per 100 children	263.6	284.1	306.7	292.0	303.6	290.0	279.3	298.0	313.1	302.7	311.9	301.0
Number of first molars extracted	14	64	131	149	135	------	25	83	149	186	169	------
Number extracted per 100 children	21.2	36.4	58.7	57.1	68.5	47.2	30.5	41.3	61.1	62.6	100.6	59.2
Number of first molar extractions indicated	13	56	108	87	87	------	46	73	87	117	59	------
Number of extractions indicated per 100 children	19.7	31.8	48.4	33.3	44.2	35.5	56.1	36.3	35.6	39.4	35.1	40.5
Number of first molars extracted or extraction indicated	27	120	239	236	222	------	71	156	236	303	228	------
First molar mortality rate per 100 children	40.9	68.2	107.2	90.4	112.7	83.9	86.6	77.6	96.7	102.0	135.7	99.7
Number of first molars filled	49	120	170	212	151	------	60	180	288	286	146	------
Number filled per 100 children	74.2	68.2	76.2	81.2	76.6	75.3	73.2	89.6	118.0	96.3	86.9	92.8

Since 100-percent correction cards were employed in the Waynesboro dental program, these records provide a means for determining the trend of public response to the program. A study of the proportions of examined children who acquired 100-percent correction cards, by school year (fig. 1), reveals that these increased yearly from 24.2 percent in 1931–32 to 87.8 percent in 1938–39. However, it will be noted that the trend is not uniform. Relatively small annual increases for the first 5 years were followed by a sharp increase for the school year 1936–37, which showed a proportion of 77.4 percent as against 48.0 percent for the preceding year. It is of interest that this marked rise in the percentage of children acquiring 100-percent correction

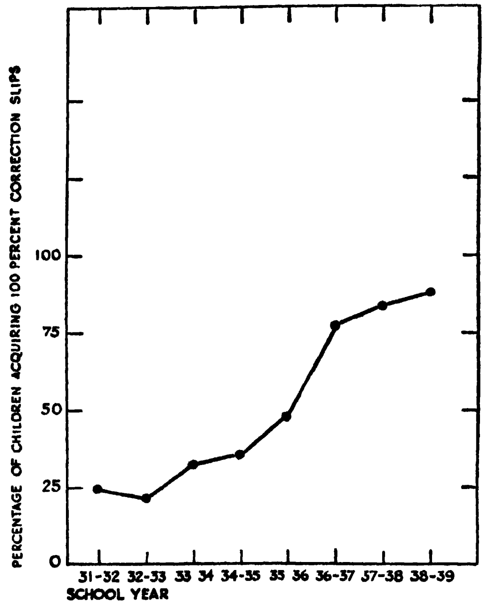

FIGURE 1.—Proportion of Waynesboro children who acquired 100-percent correction cards, by school year, 1931–32 through 1938–39

cards during the last 3 school years was preceded by two definite changes in the administrative aspects of the program. The first of these was the reduction in coverage from all eight grades to the first six, and the second was the reward of a free movie to all children obtaining 100-percent correction cards. Both of these changes may have had a beneficial effect in stimulating response, the former making possible the expenditure of more administrative time per child, and the latter providing a motive tangible to a child for attempting to obtain the correction of dental defects.

In presenting the findings resulting from the dental examinations of Waynesboro and Hagerstown children, a comparison of the prevalence rates of dental caries seems first in order. The number of first perma-

nent molars which had been attacked by caries was determined from counts of those teeth in which there was evidence of present or past caries, that is, teeth decayed, missing, or filled. Figure 2 presents these findings in terms of age and sex specific rates per 100 children. Although the rates for the two cities show slight variations, no consistent difference is apparent in the age trends. The adjusted rates show remarkedly close agreement:

	Waynesboro	*Hagerstown*
Boys	302.4	290.0
Girls	304.9	301.0

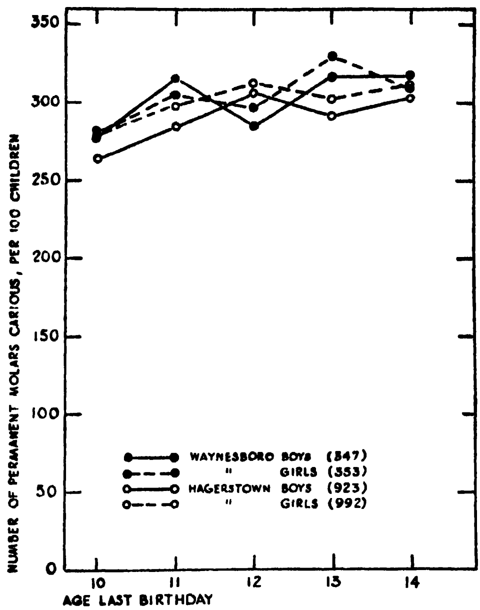

FIGURE 2.—Carious (decayed, missing, or filled) first permanent molars per 100 children in Waynesboro and Hagerstown, 1939

The striking similarity in the caries prevalence rates in first permanent molars of Hagerstown and Waynesboro children indicates that the dental needs arising from carious defects in the children of these two cities were of relatively the same magnitude. Therefore, one measure of the extent to which dental service was being supplied to meet these needs is afforded by a direct comparison of the number of dental fillings found at the time of the examinations. From the data on the frequency of filled first permanent molars, presented in figure 3, it is evident that Waynesboro children showed markedly higher filling rates than did Hagerstown children. This is also evident from the following adjusted rates, which indicate that children under the Waynesboro program received twice as much dental service in the form of fillings as did children in Hagerstown:

	Waynesboro	Hagerstown
Boys	158. 5	75. 3
Girls	180. 1	92. 8

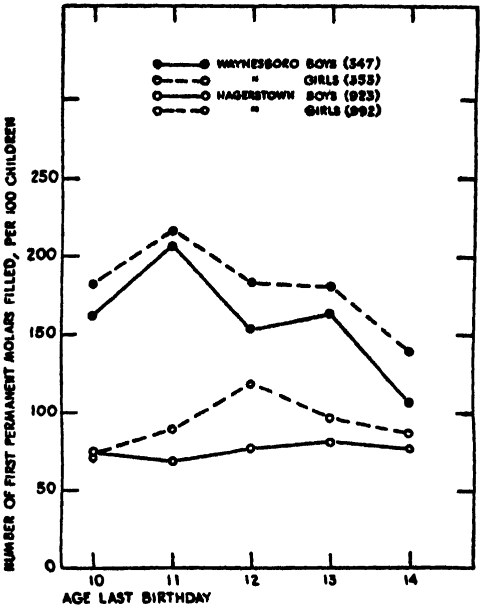

FIGURE 3.—First permanent molars filled per 100 children in Waynesboro and Hagerstown, 1939.

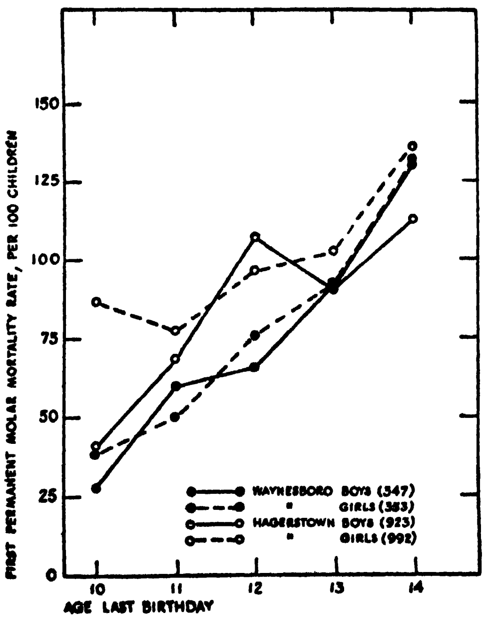

FIGURE 4.—First permanent molar mortality rates (extracted or extraction indicated) per 100 children in Waynesboro and Hagerstown, 1939

Since dental fillings are cumulative with age in the presence of constant periodic dental service, the decided decrease in the number of fillings per 100 children after age 11 in the Waynesboro group is noteworthy. In this connection it was observed from the data on 100-percent correction cards that a marked increase in the proportion of children acquiring these slips occurred during the last 3 school years studied, when the program operated in the first six grades only. It might be expected, therefore, that the amount of exposure to these 3 years of increased service would be reflected in the age specific filling rates of Waynesboro children. This assumption is

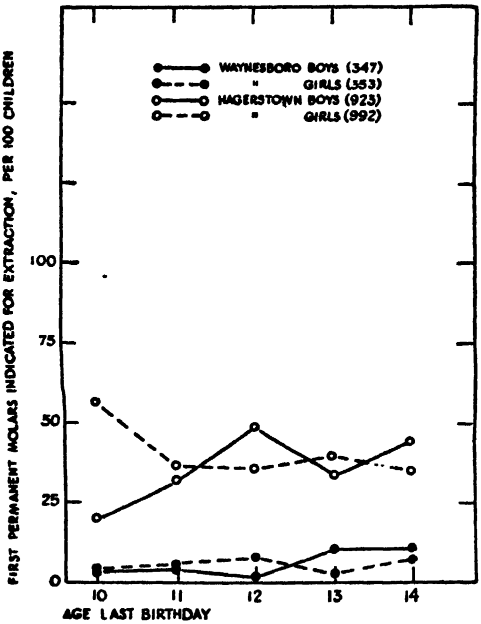

FIGURE 5.—First permanent molars indicated for extraction per 100 children in Waynesboro and Hagerstown, 1929.

in direct accord with the findings, a conclusion based on the premise that, in general, children 11 years of age were in the sixth grade at the time the dental examinations were made for the present study. Thus they constitute the oldest age group studied which had been subjected to the influences of the dental program during its last 3 years. Proceeding on this same premise, we assume that children 12 years of age were in the seventh grade and therefore had been exposed during the first 2 of these 3 years, whereas children 13 and 14 years old were in the eighth grade and had experienced only 1 year or less of exposure to the dental program during the last 3 years of its operation.

If the primary function of a dental filling is to prevent the extension of a carious process to pulp involvement and death of the tooth, then some indication of the relative volume of dental service provided for the school children of these two cities should be obtainable from a comparison of the tooth deaths which have occurred in the first permanent molars of these children. For the purpose of making this comparison, the number of teeth extracted and the number of teeth indicated for extraction were summed, and age and sex specific first molar mortality rates, per 100 children, were calculated. This procedure was based on the assumption that teeth indicated for

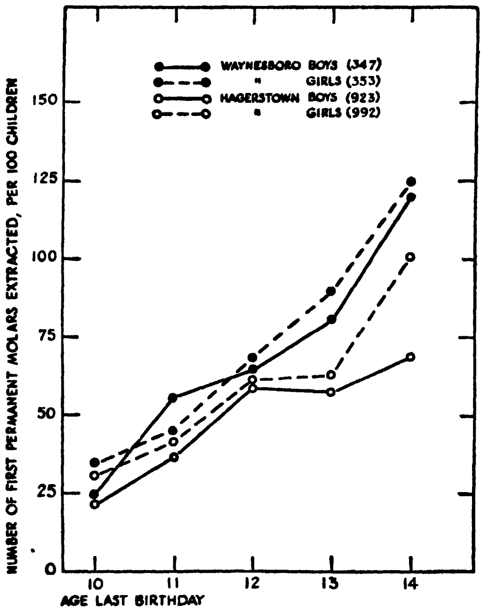

FIGURE 6.—First permanent molars extracted per 100 children in Waynesboro and Hagerstown, 1939.

extraction would be extracted if facilities for this type of dental service were provided and utilized. Therefore, it would appear not only reasonable but necessary to include counts of teeth so indicated with counts of teeth previously extracted when attempting to determine the number of tooth deaths which have resulted from untreated caries in a given group of children. From the first permanent molar mortality rates presented in figure 4 it is evident that Waynesboro girls have consistently lower rates than Hagerstown girls, and that for the age groups 10, 11, and 12, the findings are in the same direction for the boys. The average rates for all ages are:

	Waynesboro	*Hagerstown*
Boys	74.8	83.9
Girls	77.7	99.7

It is of interest to note that for the age groups 13 and 14 years the Waynesboro rates are not appreciably different from the Hagerstown rates. However, for the younger age groups studied—10, 11, and 12 years—the rates for Waynesboro children are roughly one-third lower than those for Hagerstown children. This is additional evidence that children under the influence of the Waynesboro dental program during the last 3 years of its operation definitely benefited by it.

Since a tooth indicated for extraction represents the need for a specific type of dental service, and since others have suggested that only counts of teeth actually extracted be used to evaluate dental programs, it appears desirable to study separately the characteristics of these two components of tooth mortality. When the findings on indicated extractions are examined (fig. 5), it is apparent that the Hagerstown rates are roughly five to seven times as great as the Waynesboro rates. The averages of these rates, for all ages, are as follows:

	Waynesboro	*Hagerstown*
Boys	5. 9	35. 5
Girls	5. 3	40. 5

The relative importance of indicated extractions in the total tooth mortality rates is emphasized by the fact that they accounted for approximately 40 percent of the first permanent molar deaths in Hagerstown children and for only 7 percent of those occurring in Waynesboro children. Furthermore, inasmuch as the prevalence of indicated extractions is inversely related to extraction service, these data indicate the wide disparity which exists in these communities with respect to provisions for this particular type of dental care in school children.

The number of extracted first permanent molars for the children studied is presented in figure 6 as prevalence rates per 100 children. Although the rates for Waynesboro children are consistently higher than those for Hagerstown children, the specific meaning of this finding of itself is questionable, since it has been demonstrated that extracted teeth may represent varying proportions of the total tooth deaths. The adjusted or average rates for all ages are as follows:

	Waynesboro	*Hagerstown*
Boys	68. 9	47. 2
Girls	72. 4	59. 2

However, for the general purpose of studying evaluation techniques the result of this comparison is of considerable importance, since it specifically demonstrates that an appraisal of the Waynesboro dental program from counts of extracted teeth alone would result in an erroneous conclusion.

DISCUSSION

The results of direct comparisons of dental findings in Waynesboro and Hagerstown school children have indicated the dental health benefits accruing to the Waynesboro children under an organized dental health program. Since these findings comprise individual types of data which might be employed in appraising dental programs, it seems desirable to reexamine them with a view of establishing the specific usefulness and limitations of each type as a yardstick for evaluating dental programs in general.

An analysis of data resulting from the use of the 100-percent correction cards in Waynesboro indicates (fig. 1) that the present administrative conduct of the program is apparently successful in eliciting public response. Although no data of a similar nature are available for Hagerstown to afford a direct comparison between the two cities, an internal comparison of the Waynesboro findings can be made. When this is done, it is noted that among children under the direct influence of the program the proportion acquiring 100-percent correction cards has increased annually for the last 8 years from 24 to 88 percent. This finding gives evidence of a marked and gratifying trend toward complete coverage. A more detailed examination of this trend indicates that a pronounced rise occurred during the last 3 of the 8 years studied. Inasmuch as this rise followed changes in the administrative conduct of the program, a further specific use of the 100-percent correction card is suggested, namely, to determine the relative merits of different administrative procedures in stimulating response.

One of the limitations of this record form lies in the fact that it does not differentiate, for example, between the child who required the filling of two small pit cavities and the child who required the extraction of two permanent teeth. It does, however, afford a record for use in measuring ability to bring about a visit of the child to the dentist. Whether or not that visit is most effectively timed or the service is complete and efficient remains for more detailed techniques to evaluate. Certainly the 100-percent correction card appears to offer a simple, inexpensive means of collecting specific data for determining the trend of public interest and response to a program and for evaluating the motivating powers of different administrative tactics.

If getting the child to the dentist for periodic dental service may be considered the first major function to be performed by a dental health program, then determining the volume and completeness of service dispensed becomes its second major function. With reference to this second objective, the filling of carious teeth constitutes the principal dental service problem in school children. Therefore, data on the frequency of fillings should afford a relative measure of the quantity of dental care provided. It was found that Waynesboro

children had received approximately twice as many fillings as Hagerstown children. Comparisons of this type are obviously useful, but a determination of the ratio of fillings to carious defects for a particular group of children provides more exact information on the completeness with which dental needs are being supplied. Data on fillings also give evidence of the motivating capabilities of a program, since the finding of a single filling in the mouth of a child indicates that the child in question has visited the dentist at least once. In general, however, findings with regard to fillings are of special value in estimating the volume of dental service dispensed and in calculating the unit cost of that service.

Since the fundamental purpose in providing dental service to grade school children is to prevent the loss of teeth, it follows that the adequacy and effectiveness of efforts directed towards accomplishing this purpose may be measured by the reduction achieved in tooth mortality. This statement is based on the premise that dental service should bear an inverse relationship to tooth mortality. Although the tooth mortality rates of Waynesboro and Hagerstown children (fig. 3) showed the expected inverse relation between dental care and tooth loss, the 100-percent correction card and the data on fillings were a distinct aid in bringing out this relationship. The 100-percent correction card demonstrated that among children under the direct influence of the Waynesboro program a markedly greater proportion had obtained the correction of dental defects during each of the last 3 years of the program than during the first 5 years. The data on fillings presented objective evidence that the amount of exposure to this period of increased service coverage was reflected in the age specific filling rates. In direct accord with these variations in volume of service received, the tooth mortality rates for Waynesboro children exposed during 2 or more of the last 3 years of the program were roughly one-third lower than the rates for Hagerstown children in the same age groups. On the other hand, the rates for Waynesboro children exposed during 1 year or less of these last 3 years were not appreciably different from the rates for the Hagerstown children in similar age groups.

The relationship between volume of dental service and tooth mortality, however, is extremely variable, since the effectiveness of dental care is dependent on a variety of factors. The first of these is the fact that dental caries is a chronic disease. It is evident from age specific findings on caries and tooth mortality in the permanent teeth of children that caries may progress to pulp involvement and tooth loss within 1 year after the first objective evidence of the original attack, but the rate of extension of this disease process varies greatly, and a tooth attacked may survive for many years.

This suggests that an annual examination and service program of the Waynesboro type is probably most effective in preserving those teeth with a relatively slow caries process, and it is the filling of these teeth which would least affect the tooth mortality rates during the grade school ages. Therefore, in attempting a complete evaluation of dental services in terms of tooth mortality rates it is obvious that one is not justified in limiting observations to time periods short of those when teeth filled would have died had they not been filled.

Second, the time of placement of a filling relative to the stage of the carious process is very important from the standpoint of tooth survival. The probability of saving a tooth which has first degree caries by filling is very great, but the probability decreases rapidly as the caries progresses to second degree, third degree, and fourth degree caries, when it is practically nil. Thus the service which a dentist is able to give a child for the preservation of those teeth which have been attacked by caries is determined largely by the degree of the caries extension at the time of the child's visit. If that service, for example, consists of an attempt to fill successfully five teeth with third degree caries in one case, and five teeth with first degree caries in a second case, the volume of service dispensed may very well be the same in both cases, but the effectiveness of the respective fillings in preventing tooth loss is likely to be markedly lower in the first than in the second case.

A third factor to be considered in determining the relationship of timing to the effectiveness of dental service arises from the assumption that teeth attacked soon after eruption are more likely to be affected by a rapid extension of the carious process to pulp involvement than are teeth attacked later. Since teeth are not fully calcified at the time of eruption, this assumption appears reasonable, because the distance to be traversed by the caries to pulp involvement is appreciably less in newly erupted teeth. The operation of these factors is in accord with the consensus among pedodontists that young children should visit the dentist at 3-month intervals, whereas the length of those intervals may be increased to 6 months or a year in older children and adults. These considerations suggest that since the Waynesboro program has accomplished a fairly good service coverage of children in the first six grades, on an annual basis, it would seem desirable to divert some administrative time toward decreasing the length of the interval between dental visits in order to reduce more effectively that tooth loss which occurs in school children.

From the foregoing discussion it may be concluded that tooth mortality rates do not of themselves afford a good means for estimating the volume of dental service provided for elementary school children. However, they do offer a very useful yardstick for evaluating the progress of a dental health program in preventing or postponing that

tooth loss which occurs in children during the grade school ages. Furthermore, the value of tooth mortality rates is not limited to the measurement of this progress. These rates also afford a very useful working tool for determining a practical and efficient spacing of dental visits, in order that, through the most effective timing of dental service, tooth loss in childhood may be reduced to a minimum.

The fact that indicated extractions accounted for roughly 40 percent of the first permanent molar mortality in the Hagerstown children and for only 7 percent of that occurring in the Waynesboro children emphasizes the wide differences which may exist with respect to this characteristic. In addition, these findings indicate that one of the primary and most complete health functions which the Waynesboro program is accomplishing is the removal of the health hazard represented by infected roots and devitalized and abscessed teeth among teeth indicated for extraction. It is recognized that the inclusion of indicated extractions with extracted teeth introduces additional variability into the tooth mortality rates thus computed. However, the findings discussed in a previous section of this paper clearly point out that counts of extracted teeth alone do not provide sufficient data for a reliable estimate of the total tooth loss.

The marked variations which may exist with respect to the diagnosis of teeth indicated for extraction present a problem for study and definition which is important not only for the purpose of refining evaluation techniques employing tooth mortality rates, but also because of its practical value to the dental clinician. In order to provide some notion of the reliability of the figures on extractions indicated under the definitions employed in this study, a second examination on all 12-year-old children of Hagerstown was made by another examiner in the fall of 1939. Although the two examinations were made by different examiners the findings cannot be considered entirely independent since both men have been associated with the Hagerstown dental studies since 1937. A comparison of the findings of Examiner 1 with those of Examiner 2 (table 4) shows an agreement that would be considered good if the examinations had both been made by the same person. For general use, however, further study should be made of the definitions of "indicated extractions" in order that the diagnosis may be as accurate and as objective as possible.

TABLE 4.—*First permanent molars indicated for extraction, extracted, and indicated extractions plus extracted, per 100 children, by sex and dental examiner, for Hagerstown children aged 12*

	Number of children	Extractions indicated per 100 children	Extracted teeth per 100 children	Extracted plus indicated extractions per 100 children
	Boys			
Examiner 1	223	48.4	58.7	107.2
Examiner 2	278	45.7	55.4	101.1
	Girls			
Examiner 1	244	35.6	61.1	96.7
Examiner 2	275	39.6	58.2	97.8

SUMMARY AND CONCLUSIONS

Methods for evaluating dental programs have been classified according to function into four major categories:

1. Those which measure the efficiency of the administrative organization in producing activities designed to promote dental health.
2. Those which measure public response to a unit volume of administrative activity.
3. Those which measure volume of dental service dispensed.
4. Those which measure the effects of a program on dental health.

This gross classification is used as a working base from which to approach a study of the meaning, usefulness, and limitations of various methods, so that through complete definitions and more detailed classifications the benefits of a variety of evaluation techniques may be understood and utilized.

Dental findings in children of Waynesboro, Pa., a city which has had a dental program, were compared with similar findings in children of Hagerstown, Md., a city which has not had an organized dental program. These comparisons showed that:

1. The prevalence of dental caries in the teeth of Waynesboro and Hagerstown children are strikingly similar, and therefore the dental needs arising from carious defects in the children of these two communities are of relatively the same magnitude.
2. Waynesboro children have received more than twice as much dental service in the form of fillings and extraction service as have Hagerstown children.
3. For those Waynesboro children studied who had received the maximum dental service under the program (ages 10, 11, and 12), the tooth mortality rates were roughly one-third lower than those for Hagerstown children in the same age groups.
4. Teeth indicated for extraction accounted for 40 percent of the first permanent molar mortality in Hagerstown children and for only 7 percent of that occurring in Waynesboro children, a finding which accounted for the prevalence of extracted teeth being consistently greater in Waynesboro children than in Hagerstown children.

In addition, the use of 100-percent correction cards in Waynesboro showed that the percentage of children obtaining the correction of dental defects had increased yearly from 24 percent in the first year of the program to 88 percent in the eighth year, and that the effects of administrative changes in the conduct of the program were reflected in the rate of this yearly increase.

For purposes of evaluating dental programs these findings were interpreted as follows:

1. The 100-percent correction card offers a simple, inexpensive method for measuring public response to a program and for determining the relative effectiveness of different types of administrative procedures.
2. Counts of items of service, such as fillings and extractions, provide a means for estimating the volume of dental service supplied, for determining the ratio of service to dental needs, and for calculating the unit cost of dental service.
3. Tooth mortality rates afford an accurate yardstick for measuring the progress being made against that tooth loss which occurs during an observed age span, but they are not of themselves particularly useful in estimating the volume of dental service dispensed, since the magnitude of the inverse relationship between tooth mortality and dental service may be extremely variable.
4. Counts of extracted teeth alone should not be used to evaluate a dental program unless some knowledge of the relative number of indicated extractions is available.

The apparent usefulness of these various dental findings as yardsticks for evaluating dental programs, and the recognition of some of their limitations, the obvious imperfections in our understanding of the meaning of each technique, and the realization of the exceedingly variable conditions under which a program may be initiated, administered, and supported, all serve to emphasize the need for further study of evaluation methods and to demonstrate the folly of stabilizing our present knowledge of the appraisal of dental health programs through standardization.

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STUDIES IN URIC ACID CLEARANCE [1]

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In the course of investigations into renal function studies in relation to senescence at the Baltimore City Hospitals and in some previous researches into the renal elimination of uric acid, a fairly large series of simultaneous uric acid and urea clearance tests were determined. Though the results of a few such parallel observations have been previously reported (*1*), no extensive series of cases have been found in the literature.

It is as yet unsettled whether specific depression of the renal ability to excrete uric acid is an important or secondary factor in the pathogenesis of gout. An incidence of 31 percent of chronic nephritis in 55 cases of gout, as reported by Schnitker and Richter (*2*), is unusually high in comparison with other diseases of the senescent period, such as hypertensive arterial disease, arthritis, and pernicious anemia. Yet these same authors report that renal function is rarely significantly impaired in gout in the absence of nephritis. Talbott and his coworkers (*3*) state that most gouty patients show some evidence of renal damage but that there does not appear to be any constitutional inferiority of the kidneys in excreting urates. Earlier investigations by Folin, Berglund, and Derick (*4*) lead to the conclusion that the unique high levels of uric acid in normal human blood, in contrast to the concentrations in the blood of other species, are due to a lack of responsiveness on the part of the human kidney and that this characteristic is exaggerated in gout. It is well recognized (*5*) that the blood uric acid may be raised above normal in a number of conditions other than gout, but that it is not necessarily raised in all cases of impaired renal function (*6*).

Brøchner-Mortensen has emphasized (*7*) the great variability of the uric acid clearance in both normal and gouty subjects. Contrariwise, Stefanini (*8*) has suggested that slight impairment of the renal ability to secrete uric acid is a most sensitive and early test of kidney

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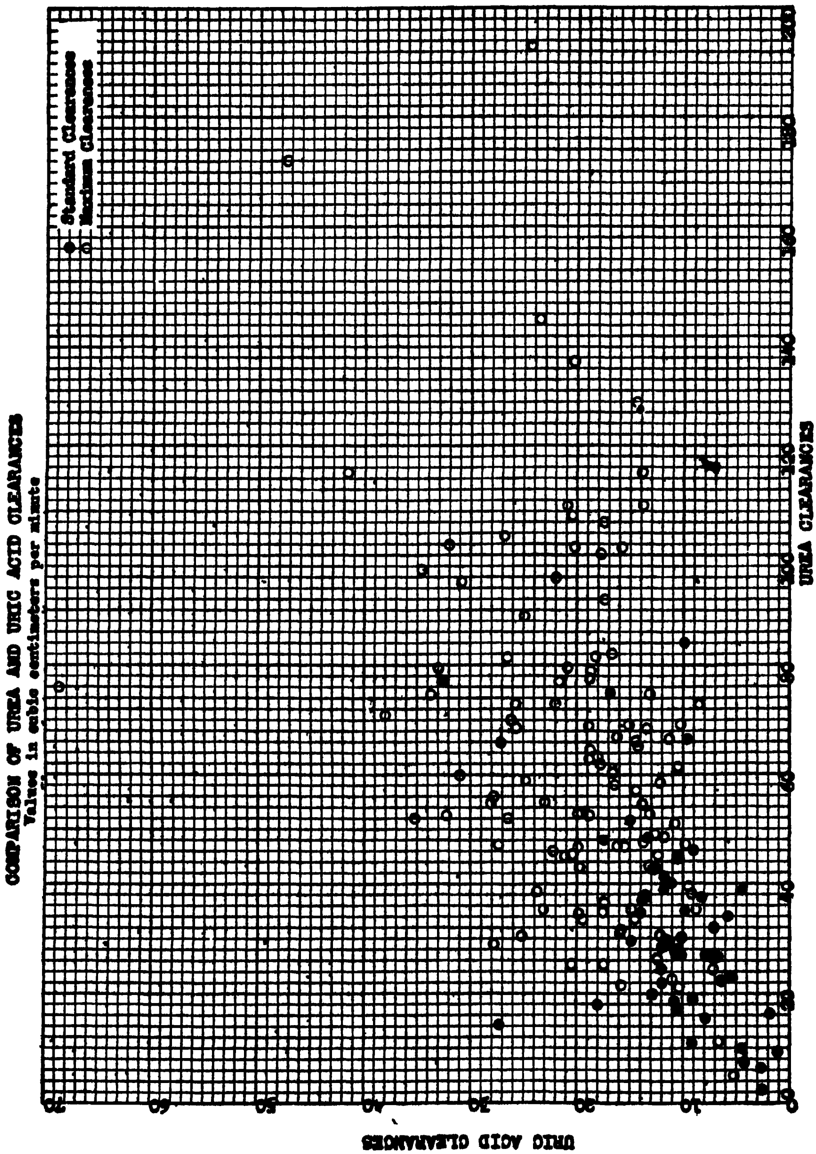
function. With such conflicting viewpoints, it appeared desirable to determine the degree of parallelism between uric acid and urea clearances in nongouty subjects. An exact parallelism is not to be expected, for the two substances are probably secreted by different portions of the nephron. Gersh (*9*), applying histochemical methods, has demonstrated that, in the rabbit at least, uric acid is eliminated by the glomeruli. Clinical functional studies (*7*) tend to confirm this viewpoint. Urea, on the other hand, is probably secreted by both the glomeruli and the proximal convoluted tubules (*10*, *11*, *12*), although Smith (*13*) dogmatically asserts that urea is excreted by glomerular filtration. The present report is limited to a comparison of the uric acid and urea clearance rates in man when the two are determined simultaneously.

METHODS

Observations were made upon 160 individuals, none of whom were afflicted with gout as far as could be determined by the usual clinical methods. The subjects of the tests ranged in age from the early twenties to the late seventies. Most of the younger individuals studied were normal. The older patients from the medical wards of the Baltimore City Hospitals almost all suffered from some disabling cardiovascular disorder. Arteriosclerosis was the most frequent disease, and many were disabled because of some previous cerebral vascular accident. No instances of frank cardiac decompensation were included in the series.

The clinical test procedure was the same in all instances: A complete specimen of urine was collected about 1 hour after the patient had previously voided. The precise time in minutes between these voidings was noted so that the rate of urine secretion per minute could be known. Blood for analysis was drawn from a cubital vein at the end of this secretion period. By encouraging a liberal intake of water before and during the test period, it was possible to obtain maximum clearances (urinary volumes in excess of 2 cc. per minute) in most instances. Almost all the tests were carried out in midmorning. The calculation of the urea and uric acid clearance followed the formulae of Van Slyke et al. (*12*), expressing the "maximum" clearance as $\frac{U\,V}{B}$ and the "standard" clearance (less than 2 cc. urine per minute) as $\frac{U\sqrt{V}}{B}$ where U is the concentration of solute (urea or uric acid) in the urine, V the volume of urine in cubic centimeters per minute, and B the concentration of solute in whole blood. The average normal for the standard urea clearance is 54 cc. blood cleared per minute and the average normal maximum urea clearance is 75 cc. blood per minute (*12*).


COMPARISON OF UREA AND URIC ACID CLEARANCES
Values in cubic centimeters per minute
Standard Clearances
Maximum Clearances
UREA CLEARANCES
20
40
60
80
100
120
140
160
180
200
URIC ACID CLEARANCES
10
20
30
40
50
60
70

All analyses were made on the same day the specimens were collected. The urea and uric acid concentrations were determined in the same specimens. The analytic methods were:

Urine urea: The urease method of Van Slyke and Cullen (*14*, pp. 547–550), determining the preformed ammonia separately as well as the total ammonia (preformed and derived from urea) and then subtracting the preformed ammonia from the total.

Blood urea: The urease method of Van Slyke and Cullen (*14*, p. 556) applied to whole blood, with aeration and direct titration of the ammonia formed.

Urinary uric acid: Colorimetric method of Benedict and Franke with arseno-phosphotungstic acid and sodium cyanide (*14*, p. 590).

Blood uric acid: Haden's modification of the Folin-Wu method for preparing protein-free blood filtrate with tungstic acid (*14*, p. 66) and the Benedict and Franke direct colorimetric method with arsenophosphotungstic acid and sodium cyanide (*14*, pp. 591–593).

RESULTS

Comparison of the 160 simultaneous urea and uric acid clearances in cubic centimeters of blood cleared per minute is best revealed graphically (fig. 1). It is notable that there is a fairly close correlation between the two secretory rates and that this correlation is most marked when a moderate degree of impairment of renal function existed. The spread of variation, however, is so great at all levels that it would be wholly unwarranted to conclude that there is more than a general parallelism between the uric acid and urea clearance rates. Age and/or arteriosclerosis do not seem to depress the one excretion any more than the other. These data and other information from the literature imply that it is improbable that the rise in incidence in gout which occurs with aging is primarily due to a progressive and selective impairment of the renal ability to secrete uric acid associated with renal and vascular senescence.

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NOTE ON A TOXIC PRINCIPLE IN EGGS OF THE TICK, *DERMACENTOR ANDERSONI* STILES*

By Edward A. Steinhaus, *Assistant Bacteriologist, United States Public Health Service*

While conducting studies of microorganisms occurring spontaneously in the Rocky Mountain wood tick, *Dermacentor andersoni*, peculiar toxic reactions have been observed in guinea pigs following the parenteral introduction of triturated tick eggs. Apparently this is the first time this phenomenon has been noted in this species of tick.

Table 1.—*Results of inoculations of varying amounts of tick-egg suspension and filtrates into guinea pigs*

(All animals except 2 were injected intraperitoneally)

Number of guinea pigs	Amount of inoculum (cc.)	Average number of days until death	Comments on survivors
Suspensions			
4	Under 1	1.2	1 survived after showing toxic symptoms
7	1.0	2.3	1 survived after becoming almost moribund.
15	2.0	2.3	
5	2.5	2.0	
Filtrates			
2 [1]	0.5	0	Both survived.
4	1.0	3.0	
3	2.0	2.0	1 survived.
2	2.5	2.5	

[1] These two animals were injected subcutaneously.

* From the Rocky Mountain Laboratory of the Division of Infectious Diseases, National Institute of Health.

EXPERIMENTAL DATA

As shown in table 1, 29 out of 31 guinea pigs injected with varying quantities of saline suspensions of *D. andersoni* eggs died, as did also 8 of 11 animals that received different amounts of Berkefeld filtrates of such suspensions. There was usually a slight rise in temperature (ranging from 39.6° to 40.8° C.) the day after inoculation. In most cases death occurred during the second day following a period of 6 to 12 hours of marked symptoms. However, death also occurred as early as the eighteenth hour and in two instances as late as the sixth day. In a typical case, the animal is depressed and has lost its appetite on the morning of the second day. Later in the day, or on the third day, it is either prostrate or has so little strength that it can be toppled over by a slight push. On autopsy, excess fluid is commonly found in the abdominal cavity, the omentum is usually thickened, and it and the subcutaneous tissues may be hemorrhagic. Flecks of exudate throughout the abdominal cavity are frequent. The lungs may be injected.

The reactions in rabbits and mice are similar but occur less consistently.

Repeated attempts to reproduce this condition in fresh animals by the transfer of blood and of saline suspensions of liver, spleen, lung, brain, and spinal cord were unsuccessful. Aerobic and anaerobic cultures made of the various guinea pig tissues usually remained sterile, but occasionally a micrococcus was isolated. However, cultures of this organism, which was also found on the surface of the eggs, did not produce the symptoms discussed. Furthermore, eggs which had been thoroughly sterilized exteriorly gave typical results.

Six guinea pigs receiving the tick-egg suspension *per os* showed no ill effects.

Filtrates (Berkefeld N) of the tick-egg suspensions, when inoculated into guinea pigs, gave results indistinguishable from those caused by the suspension itself (see table 1).

The active principle did not pass through collodion or viscose membranes during a period of 8 days. It was not destroyed by alcohol and was slightly less resistant to acetone. It withstood drying for at least a month and, in the case of the dried alcohol precipitate, was still potent after a period of 7 months. Attempts to immunize against the active principle failed, but 7 of 9 guinea pigs tested for possible immunity died in anaphylactic shock. This could have been due to normal tick-egg proteins.

Regendanz and Reichenow (*1*), by injecting experimental animals with large quantities of *Rhipicephalus sanguineus* eggs, and Oswald (*2*), by injecting the eggs of this and other ticks (*Hyalomma scupense*, *Boophilus calcaratus*, and *Rhipicephalus bursa*), produced reactions

which they (particularly the former authors) considered characteristic of tick paralysis. However, the writer is not prepared to suggest that the toxic principle in the eggs of *D. andersoni* is the one concerned in the production of tick paralysis by this species of tick.

SUMMARY

When large numbers of eggs of normal *Dermacentor andersoni* ticks were inoculated into experimental animals, characteristic toxic symptoms followed by death in 2 or 3 days usually resulted. The active principle was filterable, resistant to drying, alcohol and acetone, and was apparently nondialyzable.

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CANCER MORTALITY [1]

A Review

The fourth and final report of a series of studies of cancer mortality in the United States has recently been issued. These reports are based on unpublished data made available by the Bureau of the Census.

The following observations are made from age curves of cancer mortality specific for site, sex, and geographic section of the United States: (1) although deaths from cancer of any site are confined largely to ages over 35 years there is distinct variation in the mean age at death and in the relative age curves of specific sites of cancer; (2) sectional differences in the relative age curves of specific sites of cancer are minor, the uniformity of the curves for specific organs in different sections is striking; (3) the mean age at death for sites com-

[1] Cancer mortality in the United States. IV. Age variation in mortality from cancer of specific sites, 1930–32. Public Health Bulletin No. 275.

Earlier studies in this series are:

Cancer mortality in the United States.

I. Trend of recorded cancer mortality in the death registration States of 1900, from 1900 to 1935. Public Health Bulletin No. 248.

II. Recorded cancer mortality in geographic sections of the death registration States of 1920, from 1920 to 1935 Public Health Bulletin No. 252.

III. Geographic variation in recorded cancer mortality for detailed sites, for an average of the years 1930–32. Public Health Bulletin No. 257.

These studies, prepared by Associate Statistician Mary Gover, United States Public Health Service, are from the Division of Public Health Methods and the National Cancer Institute of the National Institute of Health in cooperation with the Division of Vital Statistics, United States Bureau of the Census. They may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C. Bulletins 248, 252, and 275 are priced at 10 cents per copy; Bulletin 257 is 15 cents per copy.

mon to both sexes is practically the same for men and women; however, the standard deviations of the age distributions of deaths are generally less for men, or there is a greater concentration of deaths at the mean age for men particularly for the external sites of cancer for which the male rates are relatively high.

INCIDENCE OF HOSPITALIZATION, JULY 1942

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 8,000,000 members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service The data cover about 60 hospital service plans scattered throughout the country, mostly in large cities.

Item	July	
	1942	1941
1. Number of plans supplying data	66	46
2. Number of persons eligible for hospital care	8,846,262	5,440,932
3. Number of persons admitted for hospital care	91,212	54,925
4. Incidence per 1000 persons, annual rate, during current month (daily rate x 365)	121.8	118.8
5. Simple average of annual rates for the twelve months ended July 31	107.4	

DEATHS DURING WEEK ENDED AUGUST 15, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce

	Week ended Aug. 15, 1942	Corresponding week, 1941
Data from 88 large cities of the United States:		
Total deaths	7,231	7,308
Average for 3 prior years	7,160	
Total deaths, first 32 weeks of year	271,365	275,753
Deaths per 1,000 population, first 32 weeks of year, annual rate	11.8	12.0
Deaths under 1 year of age	560	477
Average for 3 prior years	472	
Deaths under 1 year of age, first 32 weeks of year	17,991	16,801
Data from industrial insurance companies:		
Policies in force	64,942,559	64,418,462
Number of death claims	10,193	10,925
Death claims per 1,000 policies in force, annual rate	8.2	8.8
Death claims per 1,000 policies, first 32 weeks of year, annual rate	9.5	9.9

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED AUGUST 22, 1942

Summary

The seasonal rise in the reported cases of poliomyelitis continued during the week, but the current incidence remains below that for any prior year since 1938 A total of 183 cases was reported for the week, as compared with 173 for the preceding week, and a 5-year (1937–41) median of 492 cases. More than 600 cases were reported for the corresponding week in 1941 and 1940. The following named 7 States reported 10 or more cases for the current week: Illinois 27, New York 15, New Jersey 12, Michigan 12, Nebraska 12, Ohio 11, and Kentucky 10.

The incidence of meningococcus meningitis declined, but remains above that for any other prior year since 1938. A total of 42 cases was reported, as compared with 47 last week and a 5-year median of 34 cases for the week. The largest numbers of cases were reported from the Middle Atlantic and South Atlantic States.

Only 3 cases of smallpox were reported during the week, the same as for the corresponding week last year. A total of 612 cases has been reported this year to date, as compared with 1,153 for the same period last year, and a 5-year median of 7,974. The incidence of typhoid fever is below that for any prior year of record.

A total of 148 cases of endemic typhus fever was reported, as compared with 164 for the preceding week. Georgia reported 51 cases, Texas 40, and Alabama 19. All but one of the current cases were reported in the Southern States.

Other reports include 1 case of anthrax in Arkansas, 35 cases of amebic dysentery (14 in Texas), 271 cases of bacillary dysentery (153 in Texas), 278 cases of unspecified dysentery (229 in Virginia), 22 scattered cases of infectious encephalitis, 1 case of leprosy in New York, 8 cases of Rocky Mountain spotted fever (none of which were in the Mountain or Pacific States), and 13 cases of tularemia.

The death rate for the current week for 88 large cities in the United States is 10.4 per 1,000 population, as compared with 10.1 last week and a 3-year average of 9.8, which is the lowest rate for any week of 3-year averages. The death rate may be expected to increase gradually (in the absence of any severe epidemic) until the peak is reached sometime next January or February.

Telegraphic morbidity reports from State health officers for the week ended August 22, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41
	Aug. 22, 1942	Aug. 23, 1941		Aug. 22, 1942	Aug. 23, 1941		Aug. 22, 1942	Aug. 23, 1941		Aug. 22, 1942	Aug. 23, 1941	
NEW ENG.												
Maine	0	1	0	------	------	------	72	9	3	0	0	0
New Hampshire	0	0	0	------	------	------	0	0	0	0	0	0
Vermont	0	0	0	------	------	------	11	12	9	0	0	0
Massachusetts	2	4	3	------	------	------	62	73	65	2	0	1
Rhode Island	0	3	0	------	------	------	4	0	0	0	0	0
Connecticut	0	0	0	[1] 3	------	------	10	24	9	0	1	0
MID. ATL.												
New York	4	7	9	7	------	1	60	90	127	7	2	7
New Jersey	2	1	5	1	2	2	36	31	31	2	0	0
Pennsylvania	6	8	8	------	------	------	31	92	92	3	0	4
E. N. CEN.												
Ohio	3	4	8	1	2	2	16	28	15	0	1	1
Indiana	7	1	3	3	7	------	5	1	5	1	2	0
Illinois	19	9	11	3	2	2	7	24	24	1	3	2
Michigan [2]	1	0	6	1	------	1	37	27	36	3	1	1
Wisconsin	0	1	1	12	2	11	78	76	76	0	1	0
W. NO. CEN.												
Minnesota	1	3	3	------	2	2	8	3	3	0	0	0
Iowa	3	0	3	------	------	------	15	5	5	2	0	1
Missouri	8	5	9	------	------	1	18	7	7	0	0	0
North Dakota	0	0	0	------	18	1	7	18	3	1	0	0
South Dakota	0	7	0	------	------	------	2	2	0	0	0	0
Nebraska	0	1	1	6	------	------	19	0	1	0	0	1
Kansas	1	2	2	1	------	------	6	11	7	0	2	1
SO. ATL.												
Delaware	0	0	0	------	------	------	0	1	0	0	0	0
Maryland [2]	4	1	5	1	3	3	9	4	3	3	2	1
Dist. of Col	1	0	1	------	------	------	4	10	5	2	0	0
Virginia	8	16	15	43	40	40	8	22	22	1	4	1
West Virginia	2	0	5	------	6	11	2	31	3	0	0	1
North Carolina	10	14	23	------	------	------	2	14	14	1	0	1
South Carolina	19	22	8	104	56	56	5	55	5	0	0	0
Georgia	11	11	20	8	8	1	3	37	0	0	0	0
Florida	2	2	3	1	2	1	2	4	4	3	0	0
E. SO. CEN.												
Kentucky	4	3	7	------	------	1	3	6	6	1	0	0
Tennessee	2	10	10	9	11	6	1	15	23	0	0	1
Alabama	7	11	13	11	7	7	9	4	5	1	1	1
Mississippi [2]	8	14	14		------	------	------	------	------	1	0	0
W. SO. CEN.												
Arkansas	2	10	10	2	2	2	1	12	9	1	1	0
Louisiana	8	5	10	8	------	4	3	1	2	1	0	2
Oklahoma	0	3	3	11	19	19	0	7	3	0	0	1
Texas	25	18	18	105	285	61	25	35	24	0	1	2
MOUNTAIN												
Montana	0	1	1	1	------	------	11	3	9	0	0	0
Idaho	0	0	0	------	------	------	7	0	1	0	0	0
Wyoming	0	0	0	7	------	------	5	3	3	0	0	0
Colorado	1	10	6	16	19	1	11	14	5	1	0	0
New Mexico	1	1	1	------	------	------	2	4	4	0	0	0
Arizona	2	1	1	20	15	12	3	20	8	0	0	1
Utah [2]	0	0	1	------	9	------	31	6	9	0	0	0
Nevada	0	0	------	------	------	------	0	2	------	0	0	------
PACIFIC												
Washington	1	0	0	1	------	------	54	1	9	0	1	0
Oregon	0	5	1	6	6	6	34	8	8	2	0	0
California	10	3	14	15	16	10	65	74	74	2	1	1
Total	185	218	272	407	589	351	804	926	879	42	24	34
33 weeks	7,426	7,530	11,968	80,798	489,845	159,976	466,584	823,703	348,447	2,396	1,410	1,410

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 22, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet Fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Aug. 22, 1942	Aug. 23, 1941		Aug. 22, 1942	Aug. 23, 1941		Aug. 22, 1942	Aug. 23, 1941		Aug. 22, 1942	Aug. 23, 1941	
NEW ENG.												
Maine	0	2	2	4	2	2	0	0	0	0	0	0
New Hampshire	1	0	0	0	2	1	0	0	0	0	0	0
Vermont	0	0	0	0	2	2	0	0	0	0	0	0
Massachusetts	0	8	6	63	36	25	0	0	0	6	1	1
Rhode Island	0	4	0	4	4	1	0	0	0	0	0	1
Connecticut	2	7	3	7	6	6	0	0	0	3	1	2
MID. ATL.												
New York	15	66	39	36	35	55	0	0	0	12	18	18
New Jersey	12	25	12	18	15	15	0	0	0	8	7	8
Pennsylvania	5	82	15	32	30	49	0	0	0	14	18	18
E. NO. CEN.												
Ohio	11	44	22	32	28	40	0	0	0	8	7	18
Indiana	5	7	7	13	8	14	0	0	2	6	2	4
Illinois	27	23	21	43	38	48	0	0	2	4	23	19
Michigan [3]	12	6	21	26	27	54	1	1	1	1	7	7
Wisconsin	0	2	2	37	28	34	0	0	1	0	0	0
W. NO. CEN.												
Minnesota	3	14	10	16	8	17	0	0	0	0	0	0
Iowa	7	2	2	9	5	12	0	0	1	1	3	5
Missouri	8	0	1	19	6	13	1	0	1	10	7	22
North Dakota	0	0	0	1	0	2	0	0	1	0	0	0
South Dakota	0	0	1	2	2	4	0	0	0	0	0	0
Nebraska	12	0	1	2	3	3	0	1	0	3	0	0
Kansas	3	1	3	21	16	20	0	0	0	2	0	4
SO. ATL.												
Delaware	2	2	0	0	1	1	0	0	0	1	1	1
Maryland [3]	0	21	2	6	31	12	0	0	0	2	11	10
Dist. of Col.	0	6	3	12	4	4	0	0	0	0	2	3
Virginia	0	9	1	9	11	10	0	0	0	9	10	17
West Virginia	5	4	4	18	21	19	0	0	0	1	7	15
North Carolina	8	4	4	22	11	13	0	0	0	1	7	15
South Carlina	1	8	0	5	5	5	0	0	0	2	6	15
Georgia	0	74	4	6	14	9	0	0	0	21	28	24
Florida	2	14	3	0	2	2	0	0	0	10	7	3
E. SO. CEN.												
Kentucky	10	25	4	22	23	21	0	1	0	17	16	33
Tennessee	5	39	1	31	13	13	0	0	0	6	15	28
Alabama	1	78	2	12	11	12	0	0	0	2	5	14
Mississippi [3]	1	5	5	12	4	5	0	0	0	5	12	7
W. SO. CEN.												
Arkansas	6	1	1	6	2	4	0	0	0	11	13	25
Louisiana	3	7	6	1	3	5	0	0	0	12	9	18
Oklahoma	2	1	1	3	5	6	0	0	0	6	5	25
Texas	3	5	11	23	16	16	1	0	0	18	31	56
MOUNTAIN												
Montana	0	0	0	4	9	9	0	0	0	0	1	1
Idaho	0	0	0	0	1	1	0	0	0	0	1	1
Wyoming	0	0	0	4	0	0	0	0	0	0	0	0
Colorado	0	1	2	11	9	9	0	0	0	2	1	1
New Mexico	1	0	1	2	1	2	0	0	0	1	8	4
Arizona	0	0	0	1	1	1	0	0	0	2	0	2
Utah [3]	0	1	0	2	2	5	0	0	0	0	2	0
Nevada	0	0	------	0	0	------	0	0	------	0	0	------
PACIFIC												
Washington	1	0	1	5	7	7	0	0	0	3	9	6
Oregon	0	3	2	2	11	8	0	0	0	2	4	3
California	9	16	16	37	45	47	0	0	0	0	3	11
Total	183	617	492	641	564	690	3	3	25	212	308	503
33 weeks	1,505	3,401	2,652	89,173	89,736	116,482	612	1,153	7,974	4,025	4,760	7,105

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 22, 1942—Continued

Division and State	Whooping Cough, Week ended Aug. 22, 1942	Whooping Cough, Week ended Aug. 23, 1941	Week ended Aug. 22, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	27	13	0	0	0	0	0	0	0	0	0
New Hampshire	7	1	0	0	0	0	0	0	0	0	0
Vermont	49	14	0	0	0	0	0	0	0	0	0
Massachusetts	139	124	0	0	1	0	2	0	0	0	0
Rhode Island	12	15	0	0	0	0	0	0	0	0	0
Connecticut	61	44	0	0	0	0	0	0	0	0	0
MID. ATL.											
New York	358	253	0	1	19	0	8	1	0	0	1
New Jersey	184	116	0	2	0	0	0	0	0	0	0
Pennsylvania	267	193	0	1	1	0	0	0	1	0	0
E. NO. CEN.											
Ohio	158	221	0	0	0	1	0	0	0	0	0
Indiana	50	18	0	0	0	0	0	0	0	0	0
Illinois	320	213	0	0	32	0	0	0	1	0	0
Michigan [2]	268	182	0	0	14	0	0	0	0	0	0
Wisconsin	216	208	0	0	0	0	0	0	0	1	0
W. NO. CEN.											
Minnesota	50	53	0	0	0	0	0	0	0	1	0
Iowa	26	29	0	0	0	0	0	0	1	1	0
Missouri	17	4	0	0	0	9	0	0	0	0	0
North Dakota	3	18	0	0	0	0	1	0	0	0	0
South Dakota	1	18	0	0	0	0	1	0	1	0	0
Nebraska	2	4	0	0	0	0	0	0	0	0	0
Kansas	21	58	0	1	0	0	0	0	0	0	0
SO. ATL.											
Delaware	1	1	0	0	0	0	0	0	0	0	0
Maryland [2]	57	28	0	0	0	5	1	0	2	0	0
Dist. of Col.	26	23	0	0	0	0	0	0	0	0	0
Virginia	21	57	0	0	0	229	0	0	2	0	0
West Virginia	6	13	0	0	0	0	0	0	0	0	0
North Carolina	92	107	0	0	0	0	0	0	0	0	2
South Carolina	53	53	0	0	0	0	0	0	0	0	13
Georgia	13	20	0	2	4	0	0	0	0	0	51
Florida	18	13	0	0	2	0	0	0	0	0	14
E. SO. CEN.											
Kentucky	42	51	0	0	3	0	0	0	0	0	0
Tennessee	24	44	0	0	0	9	0	0	0	1	1
Alabama	22	12	0	0	0	0	0	0	0	0	19
Mississippi [2]	------	------	0	0	0	0	0	0	0	0	3
W. SO. CEN.											
Arkansas	9	7	1	7	10	0	0	0	0	4	0
Louisiana	6	12	0	2	0	0	1	0	0	0	4
Oklahoma	11	6	0	0	0	10	0	0	0	0	0
Texas	126	136	0	14	153	0	1	0	0	0	40
MOUNTAIN											
Montana	22	21	0	1	0	0	1	0	0	1	0
Idaho	2	17	0	0	0	0	0	0	0	0	0
Wyoming	5	15	0	0	0	0	0	0	0	2	0
Colorado	25	108	0	0	13	0	0	0	0	1	0
New Mexico	14	54	0	0	2	0	0	0	0	0	0
Arizona	7	17	0	0	0	25	0	0	0	0	0
Utah [2]	9	48	0	0	0	0		0	0	1	0
Nevada	0	1	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	24	52	0	0	0	0	4	0	0	0	0
Oregon	22	17	0	0	0	0	0	0	0	0	0
California	170	267	0	4	17	0	2	0	0	0	0
Total	3,063	2,999	1	35	271	288	22	1	8	13	148
33 weeks	122,382	146,299	------	------	------	------	------	------	------	------	------

[1] New York City only.

[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended August 8, 1942

This table lists the reports from 88 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza: Cases	Influenza: Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Baltimore, Md	4	0	1	0	2	3	6	0	6	0	1	40
Barre, Vt	0	0		0	1	0	0	0	0	0	0	5
Billings, Mont	0	0		0	1	0	1	0	0	0	0	1
Birmingham, Ala	1	0	1	0	0	0	1	0	0	0	0	1
Boise, Idaho	0	0		0	0	0	0	0	0	0	0	0
Boston, Mass	0	0		1	19	3	7	0	17	0	1	45
Bridgeport, Conn	0	0		0	0	0	0	0	4	0	0	0
Brunswick, Ga	0	0		0	0	0	0	0	0	0	0	0
Buffalo, N. Y	0	0		0	1	1	4	0	3	0	0	29
Camden, N. J	0	0		0	0	0	0	0	0	0	0	3
Charleston, S. C	0	0	1	0	1	0	1	1	0	0	1	0
Charleston, W. Va	0	0		0	0	0	0	0	0	0	0	0
Chicago, Ill	5	0	1	0	4	0	7	11	17	0	0	179
Cincinnati, Ohio	0	0	1	1	2	0	1	0	7	[illegible]	0	15
Cleveland, Ohio	1	0	4	0	2	1	7	0	12	0	0	35
Columbus, Ohio	0	0		0	2	0	3	0	4	0	2	10
Concord, N. H	0	0		0	0	0	0	0	0	0	0	0
Cumberland, Md	0	0		0	0	0	0	0	0	0	0	0
Dallas, Texas	0	0		0	0	0	4	1	0	0	1	6
Denver, Colo	0	0	4	0	11	0	2	0	1	0	0	7
Detroit, Mich	6	0	1	0	7	1	6	1	18	0	1	121
Duluth, Minn	0	0		0	3	0	2	1	1	0	0	20
Fall River, Mass	2	0		0	1	0	0	0	3	0	0	3
Fargo, N. Dak	0	0		0	0	0	0	0	0	0	0	0
Flint, Mich	0	0		0	0	0	2	0	1	0	0	4
Fort Wayne, Ind	0	0		0	0	0	0	0	0	0	0	1
Frederick, Md	0	0		0	0	0	0	0	0	0	0	0
Galveston, Texas	0	0		0	0	0	3	0	0	0	0	8
Grand Rapids, Mich	0	0		0	0	0	1	0	1	0	0	7
Great Falls, Mont	0	0		0	1	0	0	0	0	0	0	8
Hartford, Conn	0	0		0	1	0	0	1	2	0	0	19
Helena, Mont	0	0		0	0	0	0	0	0	0	0	0
Houston, Texas	2	0		0	1	0	9	0	1	0	1	1
Indianapolis, Ind	0	0		0	2	0	8	1	0	0	0	25
Kansas City, Mo	0	0		0	4	0	5	0	5	0	1	2
Kenosha, Wis	0	0		0	0	0	0	0	0	0	0	14
Little Rock, Ark	0	0		0	0	0	5	0	0	0	0	0
Los Angeles, Calif	4	0	6	0	27	0	10	0	9	0	9	16
Lynchburg, Va	0	0		0	0	0	0	0	0	0	0	1
Memphis, Tenn	0	0		1	3	0	2	1	1	1	3	5
Milwaukee, Wis	0	0		0	26	0	1	0	16	0	0	50
Minneapolis, Minn	0	0		0	2	0	4	0	6	0	0	5
Missoula, Mont	0	0		0	0	0	0	0	0	0	0	0
Mobile, Ala	0	0	3	0	0	0	3	0	0	0	0	0
Nashville, Tenn	0	0		0	0	0	1	1	2	0	0	0
Newark, N. J	0	0		0	6	0	5	1	5	0	0	24
New Haven, Conn	0	0		0	0	0	0	0	0	0	1	3
New Orleans, La	1	0		0	0	0	7	0	0	0	2	0
New York, N. Y	6	3		0	19	14	33	1	25	0	3	151
Omaha, Nebr	0	0		0	0	0	1	0	0	0	0	0
Philadelphia, Pa	1	0		0	7	1	12	0	14	0	1	9[illegible]
Pittsburgh, Pa	1	0		1	1	0	8	0	9	0	0	2[illegible]
Portland, Me	0	0		0	6	2	2	0	0	0	1	[illegible]
Providence, R. I	0	0		0	4	0	0	0	2	0	0	1[illegible]

City reports for week ended August 8, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Pueblo, Colo	0	0	-	0	0	0	1	1	0	0	0	0
Racine, Wis	0	0	--	0	5	0	0	0	3	0	0	19
Raleigh, N. C	1	0	---	0	0	0	0	0	0	0	0	3
Reading, Pa	0	0	--	0	1	0	2	0	0	0	0	12
Richmond, Va	0	0	----	0	2	0	3	0	0	0	1	1
Roanoke, Va	1	0	-----	0	0	1	0	0	0	0	0	0
Rochester, N. Y	0	2	------	0	1	0	1	1	2	0	0	9
Sacramento, Calif	0	0	----	0	0	0	1	0	0	0	0	0
Saint Joseph, Mo	0	0	----	0	0	0	2	0	0	0	0	0
Saint Louis, Mo	1	0	---	0	2	0	9	0	4	1	0	4
Saint Paul, Minn	0	0	----	0	1	0	3	0	2	0	0	32
Salt Lake City, Utah	0	0	------	0	18	0	2	0	0	0	0	6
San Antonio, Tex	0	0	--	0	0	0	0	0	1	0	1	2
San Francisco, Calif	1	0	1	1	14	0	6	0	5	0	0	12
Savannah, Ga	0	0	----	0	0	0	0	0	0	0	0	0
Seattle, Wash	0	0	-	0	18	0	3	0	0	0	0	16
Shreveport, La	0	0	--	0	0	0	3	0	0	0	0	0
South Bend, Ind	1	0	--	0	1	0	0	0	0	0	0	6
Spokane, Wash	0	0	-----	0	7	0	1	0	0	0	0	7
Springfield, Ill	0	0	-	0	0	0	0	0	0	0	0	2
Springfield, Mass	1	0	--	0	4	0	1	0	0	0	0	0
Superior, Wis	0	0	-----	0	0	0	0	0	0	0	0	0
Syracuse, N. Y	0	0	----	0	15	0	1	0	0	0	0	36
Tacoma, Wash	0	0	----	0	19	0	0	0	0	0	0	0
Tampa, Fla	0	0	--	0	0	0	1	0	0	0	0	0
Terre Haute, Ind	0	0	-	0	1	0	2	0	0	0	0	1
Topeka, Kans	0	0	---	0	1	0	1	0	0	0	0	4
Trenton, N. J	0	0		0	0	0	1	0	1	0	1	3
Washington, D. C	2	0	1	0	2	1	6	0	6	0	0	24
Wheeling, W. Va	0	0	-	0	1	0	[illegible]	0	0	0	0	2
Wichita, Kans	0	1		0	5	0	2	0	0	0	0	11
Wilmington, Del	2	0	--	0	0	0	1	0	1	0	0	0
Winston-Salem, N. C	0	0	--	0	0	0	1	0	1	0	0	1
Worcester, Mass	0	0	---	0	0	1	6	0	7	0	1	56

Dysentery, amebic.—Cases: Chicago, 2; Detroit, 1; New York, 2.
Dysentery, bacillary.—Cases: Baltimore, 5, Chicago, 1; Cleveland, 1; Columbus, 2; Dallas, 1; Los Angeles, 4, Nashville, 2; New York, 8; Richmond, 4, St. Louis; 1; Syracuse, 1.
Rocky Mountain spotted fever.—Cases: Camden, 1, Shreveport, 1; Springfield, Ill., 1.
Tularemia.—Cases: Chicago, 1.
Typhus fever.—Cases. Charleston, S. C 4; Dallas, 2; Houston, 1; Savannah, 5.

Rates (annual basis) per 100,000 population, for the group of 88 cities in the preceding table (estimated population, 1942, 33,791,053)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Aug. 8, 1942	6 79	3.86	0 77	43.98	36.26	34 72	0 31	5.09	196.13
Average for week 1937-41	9.51	3.74	1.40	[1] 59 10	38 05	34.93	0.47	8.73	215 33

[1] Median.

PLAGUE INFECTION IN CALIFORNIA

Plague infection has been reported proved in specimens collected in California as follows:

El Dorado County: July 27, in carcass of 1 ground squirrel, *C. beldingi*, found dead, and in a pool of tissue from 17 squirrels, same species, all from a locality 3 miles north of Meyers.

Los Angeles County: In pools of fleas from ground squrrrels, *C. fisheri*, as follows: July 17, 189 fleas from 24 squirrels taken at the Big Pines Incinerator Grounds at Big Pines; July 21, 19 fleas from 7 squirrels taken at the Public Camp in Big Pines Park, and 17 fleas from 8 squirrels taken at Arcadia Camp, Big Pines Park; July 22, 71 fleas from 21 squirrels taken on the premises of Jackson Stables at Big Pines; July 23 and 24, respectively, 94 fleas from 14 squirrels and 161 fleas from 9 squirrels taken at the Camp of the Owls at Big Pines; July 22, 8 fleas from 9 wood rats, *Neotoma* sp., taken at the Camp of the Owls at Big Pines.

Monterey County: July 20, in pools of fleas and ticks from ground squirrels, *C. beecheyi*, as follows: July 20, 200 fleas from 63 squirrels taken 5½ miles south and 2½ miles west of Salinas; July 21, 34 ticks from 52 squirrels taken 16 miles south of Salinas and 200 fleas from 36 squirrels taken 20 miles southeast of Monterey; July 22, 200 fleas from 50 squirrels taken 5½ miles south and 2½ miles west of Salinas.

Riverside County: May 2, in a pool of 64 fleas from 12 ground squirrels, *C. fisheri*, taken 6 miles west of Beaumont in the San Timiteo Canyon.

San Bernardino County: In pools of fleas from ground squirrels, *C. fisheri*, as follows: July 16, 43 fleas from 10 squirrels taken 2½ miles north of Wrightwood; July 16 and 17, respectively, 56 fleas from 12 squirrels and 32 fleas from 7 squirrels taken on Sheep Creek, 1 mile east of Wrightwood; July 20, 55 fleas from 6 squirrels taken at Wightwood.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended July 25, 1942.—During the week ended July 25, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	1				2	1		1	1	6
Chickenpox	4	7	1	36	113	4	18	8	58	249
Diphtheria		9	2	16	2	4	1	2	2	38
Dysentery				13						13
Encephalomyelitis							1			1
German measles		1		3	12		1		4	21
Influenza		2			1				3	6
Lethargic encephalitis						4				4
Measles				25	122	15	11	4	3	180
Mumps	1	12			121	12	47	12	60	265
Pneumonia		4			7	1			4	16
Poliomyelitis		7		8	1	2				18
Scarlet fever	2		7	30	56	9	10	16	7	137
Tuberculosis	2	6	9	129	48			17	31	242
Typhoid and paratyphoid fever			6	6	1				2	15
Undulant fever									1	1
Whooping cough		5	3	219	57	1			21	306
Other communicable diseases		5			224	30		4	3	266

SAINT LUCIA

Vital statistics—Year 1941.—The following are vital statistics for Saint Lucia for the year 1941:

Number of births	2,321
Births per 1,000 population	31.8
Number of deaths	1,368
Deaths per 1,000 population	18.7
Infant mortality rate per 1,000 live births	117
Deaths from:	
Bronchitis	68
Cerebral hemorrhage	36
Congenital malformations and diseases of early infancy	105
Diarrhea and enteritis	88
Malaria	216
Pneumonia	90
Senility	138
Tuberculosis (respiratory)	85
Venereal diseases	82

SCOTLAND

Vital statistics—First quarter ended March 31, 1942.—Following are vital statistics for Scotland for the quarter ended March 31, 1942:

	Number	Rate per 1,000 population		Number	Rate per 1,000 population
Marriages	12,743	10.3	Deaths from—Continued.		
Births	21,881	17.7	Influenza	165	
Deaths	19,441	15.7	Lethargic encephalitis	22	
Deaths under 1 year of age	1,961	[1] 90	Measles	16	
Deaths from:			Nephritis, acute and chronic	420	
Appendicitis	75		Pneumonia	1,101	.89
Cancer	2,157	1.75	Poliomyelitis	3	
Cerebral hemorrhage and appoplexy	2,056		Puerperal sepsis	48	
Cerebrospinal fever	72		Scarlet fever	6	
Cirrhosis of the liver	30		Senility	682	
Diabetes mellitus	201		Suicide	88	
Diarrhea and enteritis (under 2 years of age)	163		Syphilis	87	
Diphtheria	115		Tetanus	3	
Dysentery	12		Tuberculosis (all forms)	1,080	.87
Erysipelas	13		Typhoid and paratyphoid fever	10	
Heart disease	4,634		Whooping cough	27	
Homicide	6				

[1] Per 1,000 live births.

SWITZERLAND

Notifiable diseases—April 1942.—During the month of April 1942, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	22	Paratyphoid fever	15
Chickenpox	146	Poliomyelitis	15
Diphtheria	94	Scarlet fever	24
German measles	68	Tuberculosis	42
Influenza	74	Typhoid fever	6
Measles	853	Undulant fever	11
Mumps	203	Whooping cough	4

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January-May 1942	June 1942	July 1942—week ended—			
				4	11	18	25
ASIA							
Ceylon	C	72	10				
China: Kunming (Yunnanfu)	C	525					
India	C	28,081	4,608				
Calcutta	C	690	461				
Chittagong	C	51	4				
Rangoon	C	1					
India (French)	C	10					

PLAGUE

[C indicates cases; P, present]

Place		January-May 1942	June 1942	July 1942—week ended— 4	11	18	25
AFRICA							
Basutoland	C	10					
Belgian Congo	C	2					
British East Africa:							
Kenya	C	452	22				
Nairobi	C	64					
Uganda	C	245	13				
Egypt: Port Said	C		1				
Madagascar	C	84					
Morocco	C	232	45				
Union of South Africa	C	55					
ASIA							
China.[1]							
India	C	385					
Indochina (French)	C	79					
Palestine: Haifa	C	4					
EUROPE							
Portugal: Azores Islands	C	1					
NORTH AMERICA							
Canada: Alberta Province—Plague-infected fleas							P
SOUTH AMERICA							
Argentina: Cordoba Province	C	7					
Brazil:							
Alagoas State	C	3					
Pernambuco State	C	6					
Chile: Valparaiso	C	1					
Peru:							
Ancash Department	C	6					
Lambayeque Department	C	3					
Libertad Department	C	6					
Salaverry—Plague-infected rats		P					
Lima Department	C	49					
Lima	C	12					
Piura Department	C	14					
OCEANIA							
Hawaii Territory: Plague-infected rats		19	5			1	2

[1] Plague has been reported in China as follows. Chekiang Province, Apr. 1-10, 1942, 4 cases; Fukien Province, Jan. 1-Apr. 5, 1942, plague appeared in 11 localities: Hunan Province, week ended Apr. 18, 1942, 2 cases, Suiyuan Province, pneumonic plague appeared in epidemic form during the period Jan. 1-Apr. 4, in the northwestern area.

SMALLPOX

[C ind.

Place		January-May 1942	June 1942	July 1942—week ended— 4	11	18	25
AFRICA							
Algeria	C	450	90		11	14	
Belgian Congo	C	249					
British East Africa: Tanganyika	C	15					
Dahomey	C	53				3	
French Guinea	C	68	8				
Gold Coast	C	1,075		4	1		
Ivory Coast	C	50					
Morocco	C	1,151	62	20	7	26	9
Nigeria	C	1,216	86				
Niger Territory	C	466	46				
Portuguese East Africa	C		1				
Senegal	C	14				3	
Sudan (French)	C	32	126		5	3	
Tunisia	C	1					
Union of South Africa	C	560	7				
Zanzibar	C	[1] 2					
ASIA							
Ceylon	C	6	1				
China	C	8					
India	C	16,189	1,687				
Indochina (French)	C	2,401	155				
Iran	C	50					
Iraq	C	203	5				
Trans-Jordan	C	2					
EUROPE							
France:							
Seine Department	C	44					
Unoccupied zone	C	13					
Great Britain:							
England and Wales	C			3			
Scotland	C		5	23			
Portugal	C	35	1				
Spain	C	155	31		1		
NORTH AMERICA							
Canada	C	2			2		
Mexico	C	28					
SOUTH AMERICA							
Brazil	C		1				
British Guiana	C	1					
Colombia	C	197					
Venezuela (alastrim)	C	88	4				

[1] Imported.

TYPHUS FEVER

[C indicates cases; P, present]

Place		January-May 1942	June 1942	July 1942—week ended— 4	11	18	25
AFRICA							
Algeria	C	29,803	2,713		742		
Basutoland	C	32					
British East Africa: Kenya	C	8					
Egypt	C	16,903	2,199	39	4		
Ivory Coast	C	4					
Morocco	C	20,032	3,296	693	451	304	250
Nigeria	C		5				
Niger Territory	C	[1] 1					
Senegal	C	3					
Sierra Leone	C	7					
Tunisia	C	12,944	1,645		411		
Union of South Africa	C	507					
ASIA							
China	C	114					
India	C	6					
Iran	C	462					
Iraq	C	66	12				
Palestine	C	22					
Syria	C	22					
Trans-Jordan	C	5					
EUROPE							
Bulgaria	C	562	30	1			
Czechoslovakia	C	5					
France:							
Seine Department	C	1					
Unoccupied zone	C	224					
Germany	C	85					
Hungary	C	587	77	17	13	14	5
Irish Free State	C	8	1				
Portugal	C	1					
Rumania	C	3,077	224	19	13		11
Spain	C	3,810	40		7		
Canary Islands	C	1					
Turkey	C	P	45	8	13	5	6
Union of Soviet Socialist Republics	C	67					
NORTH AMERICA							
Guatemala	C	94					
Jamaica	C	23	4				
Mexico	C	310			3	4	7
Panama Canal Zone	C	1					
Puerto Rico	C	3					
SOUTH AMERICA							
Chile	C	39					
Colombia	C	1					
Ecuador	C	14					
Venezuela	C	15					
OCEANIA							
Australia	C	18					
Hawaii Territory	C	24	2			1	2

[1] Suspected.

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January-May 1942	June 1942	July 1942—week ended— 4	11	18	25
AFRICA							
Belgian Congo: Libenge	D	[1] 1					
British East Africa: Kenya	C	1					
French West Africa	C	1					
Gold Coast	C	1	[1] 1				
Ivory Coast	C	[2] 2					
Senegal [3]							
Sierra Leone: Freetown	C	2					
Sudan (French)	D	[1] 1					
Togo: Hohoe	C	1					
SOUTH AMERICA [4]							
Brazil: Acre Territory	D	4					
Colombia:							
Boyaca Department	D	2					
Intendencia of Meta	D	1					
Santander Department	D	2					

[1] Suspected.
[2] Including 1 suspected case.
[3] According to information dated Feb. 9, 1942, 15 deaths from yellow fever among Europeans have occurred in Senegal
[4] All yellow fever in South America is of the jungle type unless otherwise specified.

X

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

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A TECHNIQUE FOR STAINING, DISSECTING, AND MOUNTING THE MALE TERMINALIA OF MOSQUITOES [1]

By W. H. W. Komp, *Senior Medical Entomologist, United States Public Health Service*

The classification of mosquitoes is based to a large extent on the characters of the sexual appendages of the male adult, which are collectively known as the terminalia. In a number of groups, notably the genera *Anopheles* and *Culex*, certain minute though definite differences in these structures have proved so far to be the only available characteristics for the separation of a number of closely related species. From a practical standpoint, the study of the male terminalia has become of prime importance in connection with the anopheline vectors of malaria. With increasing knowledge of the problems involved, it has become evident that the older methods of mounting mosquito terminalia do not yield suitable material for the critical analysis of minute differences, which is now known to be necessary.

Among certain medically important groups in the genus *Anopheles*, for example, the shape of the male generative organ, the mesosome, and of the claspette lobes, which lie behind the mesosome, is of paramount importance in the ultimate identification of species. In the usual whole mount of the male terminalia these parts are covered by the anal lobe, a large hood-like structure, which often obscures the view of the more characteristic parts. In some species only the presence or absence of very small lateral spines on the mesosome, called leaflets, separates one species from another. These leaflets are usually invisible if covered by the anal lobe, and often must be stained to make them visible.

The usual method of preparing the terminalia for study involves maceration of the whole terminalia in weak alkali, dehydration, clearing, and mounting in balsam on a 1 x 3 inch glass slide. This method gives specimens in which many of the characteristic structures are obscured by the parts which lie over them. Some method of staining and dissecting these parts, to render their minute details more easily seen, is required for the recognition and separation of closely related species. It is often desirable to examine both sides of the terminalia under high magnification, but if they are mounted on

[1] From the Gorgas Memorial Laboratory, Panama, Republic of Panama.

the ordinary 1 x 3 inch glass slide only the upper side can be examined, as the working distance of a high-power objective is usually much less than the thickness of the slide. Some method of mounting the terminalia which will permit the examination of both sides of the parts is therefore an advantage.

The technique given below, in part devised by the author and in part adapted from other workers, is a combination of staining, micro-dissection and special mounting, which renders all parts of the male terminalia visible on both sides and permits accurate drawing or photographing of the component structures.

STAINING

Staining is done as one of the steps in preparing the material for dissection. These steps, including the staining, are as follows:

1. Under the low power of the dissecting microscope, cut off the tip of the abdomen, including the terminalia, with a small needle sharpened at one side to a knife-edge.

2. Place the severed portion in a drop of absolute ethyl alcohol in a small glass cell. The alcohol allows the immediate wetting of the specimen by the alkali used in step 3.

3. Cover with 20 percent sodium hydroxide (NaOH) solution in distilled water and let stand for 12 hours.

4. Remove alkali from cell with capillary pipette and replace with acetic alcohol (3 parts of 50 percent ethyl alcohol, 1 part acetic acid). Leave in acetic alcohol for 15 minutes.

5. Remove acetic alcohol with another capillary pipette and replace with Gage's stain, diluted 1 to 5 with distilled water. Gage's stain (*1*) has the following formula:

Acid fuchsin	0.5 gram
10 percent hydrochloric acid	25.0 cc.
(Add 10 cc. of concentrated HCl (sp. gr. 1.18) to 90 cc. distilled water.)	
Distilled water	300.0 cc.

Place one drop of this stock solution of stain in the glass cell and add five drops of distilled water. Allow to remain for 12 hours.

6. Remove stain from glass cell with capillary pipette and replace with 95 percent ethyl alcohol. Let stand for 5 minutes.

7. Remove 95 percent alcohol and replace with absolute ethyl alcohol. Let stand for 15 minutes.

8. Remove absolute alcohol and replace with clove oil. The specimen may remain in the clove oil until thoroughly cleared, or it may be left for a longer time, as the stain does not fade if the oil is fresh. Long immersion in the oil makes the specimen brittle, which is sometimes an advantage. The specimen is now ready for dissection.

PREPARATION OF DISSECTING NEEDLES

No needles fine enough to dissect the minute structures of the male terminalia are obtainable commercially. Even the small "minuten nadeln" used for double mounts of small insects are much too coarse for the purpose. It has been found impossible to grind needle points to the required fineness by using a flat stone and manual grinding; the point breaks long before such fineness is reached. Mechanical grinding, using a small high-speed motor and a special grinding wheel, will give the necessary fineness.

No. 0 stainless steel insect-pins are the crude stock from which the fine needles are made. A pin is stuck into the tip of an ordinary wooden applicator, a thin stick of wood 6½ inches long and about one-sixteenth of an inch in diameter. The pin is driven well into the wood, using forceps to press it in, and the head end is cut off, leaving about an inch projecting from the end of the applicator. The grinding apparatus is a special stone, mounted on a small high-speed motor. Three coarse stones are sold with this motor, and may be used for the preliminary rough shaping of the needle. The special stone used for the final grinding is made to standard dimensions, of a composition used commercially in grinding safety-razor blades. The motor with the stone is held in the left hand, and the applicator with the needle inserted is held in the right hand. Grinding is done under visual control under the low power of the binocular dissecting microscope (fig. 1). Two opposite sides of the needle are ground first, making a long thin blade; the other two sides are then ground, making a fine point with a cutting edge. Considerable practice is necessary before a good point can be made. However, points half the thickness of a human hair can eventually be made without difficulty. It is well to make a number of needles at the same time so that dissecting need not be interrupted if one needle breaks.

DISSECTION

The stained and cleared terminalia are placed in a very small amount of clove oil in the depression of a hollow-ground slide. It is better to cut off one end of the slide, just beyond the depression, and orient it so that the long end points away from the operator. This is done so that the slide will not be touched and accidentally moved by the mounds of plasticine used to steady the needles during dissection. Two applicators with the prepared needles are imbedded in the tops of two mounds of plasticine (modeling clay). These mounds should weigh about 35 grams each, are roughly pyramidal, and about one inch in height. The applicators are set in the plasticine at an angle of about 30 degrees from the horizontal. The points of the needles are brought close together in the field of the microscope. The left-

hand needle is used to hold the specimen down on the slide, and the right-hand needle cuts and dissects out the parts of the terminalia. The arrangement of applicators and plasticine mounds is shown in figure 2.

Detailed instructions on the dissection procedure cannot be given here, as the procedure varies with the arrangement of the parts of the terminalia of the species being dissected. However, in *Anopheles* it is best to remove the ninth tergite and the anal lobe first, and then the mesosome, leaving the claspette lobes until the last. Considerable practice is required to make a perfect dissection so that all the parts are unbroken. However, no worthwhile technique requiring a considerable degree of muscular coordination can be acquired in a day.

It is well to examine the parts while they are still in clove oil so that various aspects may be brought into view by moving the parts about with a needle. Drawings of the parts in various aspects can now be made, using a compound microscope with a 20× objective and a 10× eyepiece. The part to be studied should be stranded in the edge of the drop of clove oil to avoid motion from currents in the oil.

MOUNTING

After dissection the parts are removed to the slide on which they are to be permanently mounted. The usual 1 x 3 inch glass slide may be used, but this allows only the upper side of the specimen to be viewed with a high-power objective, as the thickness of the glass slide is greater than the working distance of such an objective.

The special slides designed by the writer are a modification of the Cobb slide (*3*). They are made from 1 x 3 inch (25 x 75 mm.) aluminum blanks, 1.5 mm. in thickness, with a central circular hole 13 mm. in diameter; concentric with this hole is a shoulder 17 mm. in diameter and 0.3 mm. deep. An ordinary No. 1 circular cover-glass 15 mm. in diameter is cemented to the shoulder, covering the hole, using any one of a number of commercial cements, such as "Duco." The cement should be thinned with acetone and liberally applied to the shoulder of the slide with a small brush. The cover-glass is set into the cement immediately, before it has a chance to dry.

The various separate parts of the terminalia should be arranged in a systematic order on the slide. It is well to follow the order in which the parts occur in the undissected terminalia; the two side pieces are placed nearest 12 o'clock on the cover-glass; immediately beneath is the mesosome, then the claspette lobes, and, nearest 6 o'clock, the ninth tergite and anal lobe. Small drops of balsam, one for each part to be mounted, are placed on the lower cover-glass which has been affixed to the aluminum slide. These small drops are applied from the point of a capillary pipette which can be made by drawing out in a flame the

PLATE I

FIGURE 1.—Needle in applicator being sharpened against stone mounted on small electric motor, under visual control.

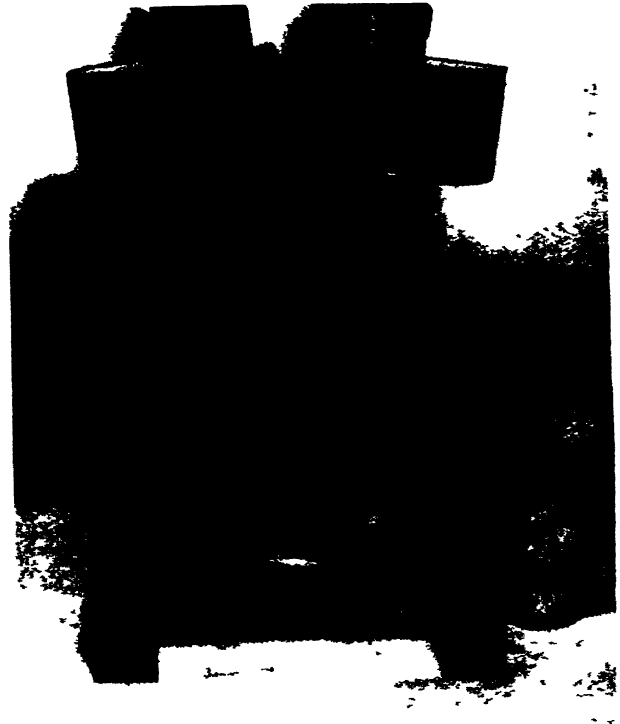

FIGURE 2.—Method of supporting dissecting needles in mounds of modeling clay. Note position of hollow-ground slides.

end of a pipette from a dropping bottle provided with a ground-in pipette. The balsam, which should be rather thin, is kept at a level in the dropping-bottle such that the fine tip of the pipette barely reaches below the surface. Using the rubber bulb of the pipette, the drops are carefully squeezed out onto the lower cover-glass under visual observation under the low power of the dissecting microscope. The separated pieces of the terminalia are picked up on the end of a needle, and each is transferred to one of the balsam drops. All this is done, of course, under the dissecting microscope. To make the transfer easy, the slide containing the parts in clove oil is placed parallel to the slide to which the parts are to be transferred, so that, using the left hand, both may be moved back and forth as a unit under the microscope.

After the parts have been transferred to the balsam drops and properly oriented, the slide is put away in a dust-proof box for a week or more. This allows the balsam to harden so that the parts imbedded in it cannot move about when the upper cover-glass is placed over them. At the end of this time a small drop of balsam is placed in the middle of a 12 mm. round cover-glass and inverted over the lower cover-glass. Just enough balsam should be used to spread evenly to the edges of the upper cover-glass. Both sides of the specimen may now be examined with the oil-immersion objective, since the material is covered on each side only by the thickness of a cover-glass.

The preparation may be labeled by scratching the data on the aluminum slide with a diamond pencil or the conventional gummed paper label may be used.

ILLUMINATION

The smallness of the parts to be dissected requires high illumination of the microscope field. The writer has used a Spencer Universal Microscope Lamp, No. 358, in his work, and finds it satisfactory if suitably adjusted. The lamp bulb must be drawn back as far as possible in the sleeve, so that the intensely brilliant image of the lamp filament is thrown on the field. The Nicholas Illuminator of Bausch & Lomb can also be used if the tube containing the lower lens is suitably lengthened so that an image of the filament may be obtained. A makeshift lamp, which may be very useful in the field, can be made from a two-cell focusing flashlight, focused so that the light is concentrated on the field, and supported on a stiff bent wire stand.

THE MICROSCOPE

Almost any type of binocular dissecting microscope capable of giving a wide field and a magnification of from 60 to 80 diameters may be used for dissection. The base of the microscope which carries the illuminating mirror must be removable, as the glass plate forming the stage of the microscope must rest on the table on a level with the operator's hands. Some method of changing quickly from low to high

power is convenient, but not absolutely necessary. Eyepieces giving a magnification of 9× and objectives giving a magnification of 6.8×, a total magnification of about 60 diameters, are used for the actual dissection, and a magnification of about 10 diameters is used for grinding the needles and putting the drops of balsam on the slide.

A good binocular compound microscope is a necessity for the examination of the parts of the terminalia after they have been mounted under the cover glass. A useful combination is a 20× objective and a 7.5× or 10× ocular, but to show fine detail higher powers must be used.

Paired eye caps with perforated diaphragms are useful in obtaining a stereoscopic image. A simple expedient, giving the same effect as the eye caps, is to cut from thin black paper a circular disc which has the same diameter as the ocular. This disc is cut in half, and the halves are stuck lightly to the oculars so that the inner halves of each are covered, the straight edges of the half discs being vertical. By moving the lightly adhering half discs toward and away from each other a position will be found where an excellent stereoscopic image is obtained. The half discs are then glued securely to the oculars. A stereoscopic image is very useful in determining whether a certain part is below or above another part when making descriptions or drawings.

APPLICATIONS OF THE METHODS TO OTHER OBJECTS

The methods outlined above are applicable to other objects besides the terminalia of mosquitoes. Anyone working with insect genitalia which require dissection for proper demonstration will find the method of grinding the needles and supporting them during dissection of great assistance.

The methods described here have been taught to two coworkers who now make creditable preparations; the technique apparently does not require any special aptitude, although facility cannot be gained in a day. Dissection requires considerable patience and practice but the results are worth the time and effort expended.

One example of the advantages of dissection as applied to mosquito terminalia is the demonstration of the striking differences between two anopheline species found in the Caribbean region, *A. neivai* and *A. bellator*. Regarding the terminalia of these, Root (*4*) states: "The genitalia of these two species [*bellator* and *hylephilus* (=*neivai*)] agree in every detail with those of *A. neivai*, so far as I could see." The writer (*5*) has shown that the mesosome of *A. neivai* is without leaflets, while that of *A. bellator* has two very large reflexed leaflets, somewhat closely appressed to the mesosome, but easily visible when stained and dissected. The microphotographic illustrations in his article (*5*) are examples of the possibilities of the method in clearing up the specific identities of closely related species and in illustrating these differences by photography, thereby eliminating the personal equation ...ological drawings.

SUMMARY

Methods of staining, dissecting, and mounting the male terminalia of mosquitoes are described. Procedure for preparing the material, a description of the method and apparatus used in grinding needles, the technique of dissecting, and a description of the modified slide-mount used, are given. The methods outlined give preparations which show both sides of the well-stained, dissected specimen, and which permit a thorough study of the parts to be made. Such preparations are superior to mounts made without dissection, in which some of the characteristic structures may be obscured by other parts which overlie them.

ACKNOWLEDGMENTS

The writer is indebted to Dr. Harold Morrison of the Bureau of Entomology, United States Department of Agriculture, Washington, D. C., for calling his attention to Gage's stain; to Dr. Robert Chambers, Professor of Experimental Biology, New York University, for the method of using plasticine for steadying needles while dissecting; and to Mr. Gerald Thorne, Nematologist of the Bureau of Plant Industry, United States Department of Agriculture, Washington, D. C., for acquainting him with the original Cobb slide.

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DATA ON THE CONCURRENCE OF DEATH FROM TUBERCULOSIS, INFLUENZA AND PNEUMONIA, CANCER, AND HEART DISEASES AMONG HUSBANDS AND WIVES[1]

By ANTONIO CIOCCO, *United States Public Health Service*

INTRODUCTION

Recently the writer (*1*, *2*) reported that apparently there is a tendency for husbands and wives to die from the same cause when one of

[1] From the Division of Public Health Methods, National Institute of Health. This is the sixth of a series of papers on the biological factors in public health. Previous articles are:
The trend of the age of marriage in Washington County, Md., from 1897 to 1938. Human Biology, 12: 59–76 (1940).
The trend in the proportional contribution of the socio-economic groups to natality. A report based on the births in Washington County, Md., from 1898 to 1938. Human Biology, 12: 186–202 (1940).
On the mortality in husbands and wives. Human Biology, 12: 508–531 (1940).
Parity order of birth, age of mother, and socio-economic status. Human Biology, 13: 64–81 (1941).
On the mortality in brother-sister and husband-wife pairings. Human Biology, 13: 190–202 (1941).

the spouses has died from tuberculosis, influenza and pneumonia, cancer, or heart disease. These findings resulted from an analysis of the death records of 2,571 white married couples, both the husband and the wife having died in Washington County, Md., between 1898 and 1938. The concurrence of tuberculosis morbidity and mortality among husbands and wives has long been demonstrated. That such a relationship exists also with reference to influenza and pneumonia mortality might have been assumed because of the infectious nature of these diseases. However, with reference to heart diseases and cancer the association was not expected. Many inferences could be drawn from these findings, and if the results are correct it would seem that important leads for future investigations could be uncovered. Therefore, it has appeared worth while to extend the investigation on the mortality of spouses by analysing other and different kinds of data about the causes of death among husbands and wives. The findings obtained from the analysis of a second sample will be presented in this paper and compared with those published.

MATERIAL

The data on which this analysis is based are derived from records collected by Dr. Raymond Pearl [2] shortly before his death. These records consist of (*a*) copies of the death certificates of a sample of white male life insurance policyholders who died between 1937 and 1940, and (*b*) transcriptions of the medical examination and family history obtained on these persons at the time of application for the insurance. From these records, which number over 10,000, those utilized for this study concern the ones wherein at the time of application both parents of the policyholder were stated to be dead and the causes of their deaths were given specifically, i. e.: not expressed in uncertain and vague terms. The records of 2,346 policyholders, referring to 2,346 parental couples, satisfy these criteria and form the material for this analysis.

It is obvious that, because of its origin and the method of selection, this sample of couples has characteristics which differentiate it from the general population. These characteristics have been described in some detail elsewhere by the writer (*3*). Here it is pertinent to note how this sample differs from that originating from the mortality records certified in Washington County, Md. For the sake of convenience the latter will be called the W. C. D. C. (Washington County death certificates) series and the former the I. A. (insurance applications) series. The major differences between the two samples are:

1. The W. C. D. C. series originates from one small section of the country; the I. A. series originates from all parts of the country.

[2] The author wishes here to express his thanks to Prof. L. J. Reed, of the Johns Hopkins School of Hygiene and Public Health, for the privilege of making this use of the records, and to Mr. J. F. Kish for the assistance generously given.

2. In collecting the W. C. D. C. sample, the reproductive history of the couples or the status of the offspring were not considered. These elements were, however, important in the selection of the I. A. series, where couples are represented because they had at least one male offspring and this offspring was of age (after the death of the parents) to be financially and physically able to obtain life insurance.

3. In the case of the W. C. D. C. series the cause of death was stated by a physician; for the I. A. series the information on the cause of death was acquired through the offspring.

These differences between the two samples are here emphasized to bring out how divergent in kind they are. Thus, if the association between husbands and wives with reference to the causes of death mentioned is due to some condition inherent in sampling it would seem improbable that the same condition should be present in two series of such a dissimilar nature.

The divergences in the sampling are reflected in the age at death and cause of death of the individuals of the two series. The mean age at death of the husbands of the W. C. D. C. series is 68.8 ± 0.26 years; of the wives it is 68.1 ± 0.29 years. For the husbands of the I. A. series the mean age at death is 61.9 ± 0.18 years, while for the wives it is 57.4 ± 0.20 years. On the average the I. A. series is younger than the W. C. D. C. series, a finding which is explainable by the selective procedure employed.

The frequency of deaths from the four groups of causes in the two series is presented in table 1.

TABLE 1.—*Frequency of stated causes of death in two series of white husbands and wives*

Cause of death	International list numbers (1929 revision)[1]	W. C. D. C. series				I. A. series			
		Husbands		Wives		Husbands		Wives	
		Number	*Per cent*	*Number*	*Per cent*	*Number*	*Per cent*	*Number*	*Per cent*
Tuberculosis (all forms)	23-32	117	4.55	163	6.34	78	3.32	105	4.48
Influenza and pneumonia (all forms)	11, 107-109	180	7.00	222	8.63	418	17.82	413	17.60
Heart diseases	90-95	614	23.88	681	26.49	273	11.64	266	11.34
Cancer and other malignant tumors	45-53	187	7.27	274	10.66	105	4.48	178	7.59
Other causes		1,473	57.30	1,231	47.88	1,472	62.74	1,384	58.99
All deaths		2,571	100.00	2,571	100.00	2,346	100.00	2,346	100.00

[1] In coding the causes of death for the I. A. series the 1938 revision was actually employed.

In table 1 the dissimilarity of the two samples is brought out in a striking manner. In particular, one notes that among the husbands and wives of the I. A. series the percentage of deaths due to influenza and pneumonia is higher while the frequency of heart diseases as a cause of death is lower than in the other series. The younger age of the I. A. subjects may account for some of the observed dissimilarity, but

other factors may also be postulated. For example, it is known that tuberculosis and rheumatic heart disease are familial conditions and consequently offspring of parents dying from these causes are probably not represented among the insurance applicants as often as would be expected in the general population. In any event, whatever the final explanation of the differences between the two series may be, it is desired at the moment only to point out that such differences exist.

TUBERCULOSIS MORTALITY AMONG HUSBANDS AND WIVES

TABLE 2.—*Concurrence of tuberculosis mortality among spouses*

Cause of death	Number		Percent of spouses who died from tuberculosis	
	W. C. D. C. series	I. A. series	W. C. D. C. series	I. A. series
Husbands:				
Tuberculosis	117	78	17.1±3.6	24.4±4.9
Other causes	2,454	2,268	5.8± .5	3.8± .4
Wives:				
Tuberculosis	168	105	12.8±2.6	18.1±3.8
Other causes	2,408	2,241	4.0±[illegible]	2.6± .4

In table 2 are presented the figures relative to the frequency of tuberculosis as a cause of death among the spouses of persons who died and of persons who did not die from this disease. The essential feature of the data given in the table is the high rate of tuberculosis mortality among the spouses of persons who died from the disease in comparison with the rate among the spouses of the persons who died from other causes. In the W. C. D. C. series 17.1 percent of the wives of men who died from tuberculosis also died from this cause; in the I. A. series this percentage is 24.4. Among the wives of men who died from causes other than tuberculosis the percentage that died from tuberculosis is 5.8 in the W. C. D. C. series and 3.8 in the I. A. series. With reference to the tuberculosis mortality among the husbands of women who died from tuberculosis and among the husbands of women who died from other causes, a picture similar to the above is obtained. Thus, for the W. C. D. C. series it appears that when wives died from tuberculosis the frequency of tuberculosis mortality of their husbands was three times as high as the rate of tuberculosis mortality among the spouses of women who died from causes other than tuberculosis. For the I. A. series it was about six times as high. In both series this concurrence of tuberculosis mortality among the spouses is statistically significant whether measured by the chi-square test or by the differences between the percentages. The findings in the two samples are therefore in accordance and agree with many observations reported in the literature. In view of this

agreement some assurance is acquired that the characteristics of the two samples are not of a nature to alter results that long experience has shown to be expected.

INFLUENZA AND PNEUMONIA MORTALITY AMONG HUSBANDS AND WIVES

TABLE 3.—*Concurrence of mortality from influenza and pneumonia among spouses*

Cause of death	Number		Percent of spouses who died from influenza and pneumonia	
	W. C. D. C. series	I. A. series	W. C. D. C. series	I. A. series
Husbands:				
Influenza and pneumonia	180	418	15.0±2.7	22.5±2.0
Other causes	2,391	1,928	8.2± .6	16.6± .8
Wives:				
Influenza and pneumonia	222	413	12.2±2.2	22.8±2.1
Other causes	2,349	1,953	6.5± .5	16.8± .9

For influenza and pneumonia mortality, the data of table 3 indicate that the same relations are to be observed for the I. A. series as were noted for the W. C. D. C. series, even though the actual prevalence of deaths from these diseases differs considerably in the two samples. Among the wives of men of the I. A. series who died from influenza and pneumonia 22.5 percent also died from the same cause but only 16.6 percent of the wives of men who died from other causes died from influenza and pneumonia. The difference between the two percentages is statistically significant in terms of its standard error. The same is true when the rate of influenza and pneumonia mortality among the husbands of women who died from these diseases is compared with that of the husbands of women who died from other causes; the percentages being, respectively, 22.8 and 16.8. Hence, among the spouses of persons who died from the diseases under discussion the frequency of mortality from the same diseases is 1.4 times as high as the frequency of mortality from influenza and pneumonia among the spouses of persons who died from other causes. This ratio is only slightly lower than that noted for the W. C. D. C. series, which is 1.8. No information is available for the I. A. series regarding the time elapsed between the death of the two marital partners both of whom died from influenza and pneumonia; however, for the W. C. D. C. series the average interval is about 9 years. Therefore, while it might have been expected that influenza and pneumonia occur with higher frequency in marital partners because of direct contagion, the findings reported here are somewhat unusual, at least for the W. C. D. C. series, in view of the long interval of time between the deaths of the husband and wife.

CANCER MORTALITY AMONG HUSBANDS AND WIVES

TABLE 4.—*Concurrence of cancer mortality among spouses*

Cause of death	Number		Percent of spouses who died from cancer	
	W. C. D. C. series	I. A. series	W. C. D. C. series	I. A. series
Husbands:				
Cancer	187	105	15.5±2.7	14.3±3.4
Other causes	2,384	2,241	10.3± .6	7.3± .6
Wives:				
Cancer	274	178	10.6±1.9	8.4±2.1
Other causes	2,297	2,166	6.9± .5	4.2± .4

The findings from the W. C. D. C. series with reference to the concurrence of cancer mortality among husbands and wives are very interesting. As the data of table 4 clearly show, a similar association is present for the I. A. series. In the latter series, among the wives of men who died from cancer 14.3 percent died from the same cause, while among the wives of men who died from diseases other than cancer only 7.8 percent died from cancer. For husbands of women who died from cancer and husbands of women who died from other causes the relative frequency of cancer mortality is 8.4 and 4.2 percent, respectively. For each sex the difference in the relative frequency of cancer between the spouses of persons who died from this cause and of persons who died from other causes is probably significant from a statistical standpoint. Moreover, a chi-square test indicates that more couples are observed both of whom died from cancer than would be expected on the basis of chance assortment of men and women who died from cancer in the sample. According to the findings from the W. C. D. C. series, the chances of a spouse dying from cancer are 1.5 times greater if the other spouse has died from cancer than if the other spouse has died from other causes. Almost the same ratio, 1.8, is revealed by the I. A. series. From the results observed in these two series there would be some justification to conclude that when one spouse dies from cancer the other is more likely to die from the same cause than the spouse of a person who dies from causes other than cancer.

HEART DISEASES MORTALITY AMONG HUSBANDS AND WIVES

The data in table 5 show that the situation with regard to heart disease mortality differs in the two series. In the I. A. series, among the spouses of persons who died from heart diseases the percentage of those who died from the same diseases is slightly, although insignificantly, lower than that of the spouses of persons who died from other causes. Without other information about the kind of heart involvement that caused the deaths of the individuals in the two samples, it

is difficult to explain the reason for the dissimilarity between the series. In discussing the findings of the W. C. D. C. series the writer pointed out that if it is assumed that rheumatic heart disease has an infectious origin the concurrence of mortality from heart diseases among husbands and wives might be explained on those grounds. If this were so, and if it were assumed that the low prevalence of heart disease mortality in the I. A. sample is also due to a selection against rheumatic heart disease, the negative results of the I. A. sample with respect to heart diseases could be understood. However, other factors may enter into the picture and it seems unwise to speculate without more pertinent knowledge.

TABLE 5.—*Concurrence of heart diseases mortality among spouses*

Cause of death	Number		Percent of spouses who died from heart diseases	
	W. C. D. C. series	I. A. series	W. C. D. C. series	I. A. series
Husbands:				
Heart diseases	614	273	30.0±1.8	10.6±1.9
Other causes	1,967	2,173	25.4± .1	11.4± .7
Wives:				
Heart diseases	681	266	27.0±1.7	10.9±1.9
Other causes	1,890	2,080	22.8± .1	11.7± .7

DISCUSSION

The main finding which emerges from this study is that two samples of independent and noticeably different kinds of records on the causes of death of husbands and wives indicate a marital concurrence of mortality from tuberculosis, influenza and pneumonia, and cancer. The two series, however, disagree with regard to the prevalence of deaths from heart diseases among husbands and wives. For the latter diseases the unexpected association found in the first sample is not present in the second. A satisfactory explanation of this discrepancy cannot be advanced without more complete information about the clinical types of heart involvement that caused the deaths. So, for the time being, the question of marital concurrence of heart diseases remains uncertain, although it may be remarked that in the second series an abnormally low percentage of deaths from heart diseases was observed, besides the absence of any association between husbands and wives.

As has been repeatedly stated, the results concerning the marital concurrence of tuberculosis mortality are in agreement with the findings reported by other investigators. The majority of these infer that the association is a consequence of contagion from one to the other partner. Although other factors may also be postulated it seems safe to accept this inference. So far as the present results are concerned, it is particularly gratifying to be able to point out that,

although the two series of records which constitute the material of this inquiry differ not only from each other but also from the data on which the investigations of others have been based, all lead to the same conclusion.

The findings with respect to influenza and pneumonia cannot be explained as easily as those on tuberculosis. The acute nature of the diseases and the long interval between the deaths of the two marital partners (known for one series and suspected for the other) seems to preclude the element of direct contagion from one to the other partner. Other conditions must play a part in the association observed, such as source of infection, persistence of parasites, immediate environment, or assortative mating with reference to biological constitution.

It is, however, with respect to cancer that the observations reported assume special interest. Although the possibility of some hidden statistical artefact cannot be entirely excluded, it is noted that two sizable and independent samples differing in many characteristics lead to almost identical results. A possible inference that could be drawn is that some condition of the particular environment shared by a husband and wife probably is important in the etiology of the disease.

The findings of this and the previous study justify certain general considerations pertinent to a delineation of public health methodology. In the first place, the utility of studying morbidity or mortality in terms of the familial aggregate becomes clearly apparent, as it has been to both geneticists and epidemiologists. Even though this approach to the study of public health problems has not yet been specifically formulated, nevertheless in practice it is followed, and probably a good deal of credit for the reduction of tuberculosis mortality must be given to the procedure of directing observations on the families of tuberculous individuals. How necessary such a procedure is may be inferred from the data reported in these and other inquiries on tuberculosis among husbands and wives. But, if the findings reported here describe a true phenomenon, it would seem that for other conditions besides tuberculosis further reduction in the prevalence or incidence rate could be expected if attention were focussed not only on the sick person but on his family as well. By studying the familial aggregate it will also be possible to identify more precisely those pathologic conditions for which the variations in the innate biological constitution are an important factor. In this way it will also become possible to identify those pathologic conditions in the etiology of which the innate biological constitution is important. For example, evidence has recently been presented (*3*) showing that the chances of death from cardiovascular diseases increase in order according to whether none, one, or both of the parents have died from these diseases. From the standpoint of public health

this means that a positive family history in an apparently healthy person is a sign demanding the provision of whatever preventive measures are appropriate.

The study of morbidity and mortality among husbands and wives, since it concerns persons who live in intimate contact but generally are not related, constitutes an important phase of the investigation of diseases from the standpoint of the family group. It is apparent, as has been pointed out (*4*), that data on marital couples serve for purposes of comparison with similar data on siblings. Through such comparison an evaluation may be made of the action of the same genetic background and childhood environment but a different adult environment, on the one hand, with that of the same adult environment but a different genetic background and childhood environment on the other hand. Furthermore, the study of husbands and wives offers the special opportunity of distinguishing the elements of the immediate environment which enter into the etiology of disease and, when the prime etiologic factor is obscure, of clarifying it. This value of the method has been appreciated by a few, noteworthy being Moore and Kemp (*5*), who sought to determine by this the existence of a neurotropic strain of *Spirochaeta pallida*. The possibilities of this method of approach are far reaching. When one considers the results of the analysis discussed here with respect to influenza and pneumonia and cancer there seems to be good evidence that, if the marital concurrence noted is found to be universal, then a thorough inquiry into the modalities by which it comes about would contribute greatly toward further knowledge of the epidemiology of the diseases.

SUMMARY

The frequency with which the spouses of persons who died from either tuberculosis, influenza and pneumonia, cancer, or heart diseases have died from the same cause has been examined for 2,346 white married couples, the parents of an equal number of male life insurance policyholders. A comparison has also been made between the findings on this series and those reported previously from the study of 2,571 couples who died in Washington County, Md.

The results of this inquiry reveal:

1. In both series the relative number of persons who died from the same cause as the spouse is significantly higher when the spouses died from tuberculosis, influenza and pneumonia, and cancer, respectively, than when the spouses died from other causes.

2. In the case of tuberculosis the percentage that died from this cause is three to six times as high among the spouses of persons who died from tuberculosis as among the spouses of persons who died from other causes.

3. With respect to influenza and pneumonia the relative number of deaths from these causes is 1.4 to 1.8 times as high among the spouses of persons who died from these diseases as among the spouses of persons who died from other causes.

4. The percentage of cancer deaths is 1.5 to 1.8 times as high among the spouses of persons who died from cancer as among the spouses of persons who died from causes other than cancer.

5. The new series of data does not corroborate the marital association regarding mortality from heart diseases as observed previously for the series based on the death records of Washington County, Md.

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ADDITIONAL HIGHLY VIRULENT STRAINS OF ROCKY MOUNTAIN SPOTTED FEVER VIRUS ISOLATED IN GEORGIA [1]

By George D. Brigham, *Associate Bacteriologist*, and James Watt, *Passed Assistant Surgeon, United States Public Health Service*

Highly virulent strains of Rocky Mountain spotted fever virus were recovered in the East in 1939 by Topping and Dyer (*1*) and Brigham and Watt (*2*).

We can now report the recovery in Georgia of four more highly virulent strains of Rocky Mountain spotted fever virus.

During the summer of 1940, we were advised of a case of spotted fever which terminated in the death of the patient, a 9-year-old boy, on the thirteenth day of illness. Blood taken the day before death agglutinated Proteus OX–19 in 1:1280 dilution. The child had a history of tick bite a few days prior to onset. Ticks were collected from various animals present on the farm and two strains of the infectious agent were isolated. One strain, 308, was recovered from a pool of 20 partially engorged female ticks (*D. variabilis*). The other strain, maintained for a few transfers only, was recovered from a pool of 27 male ticks (*D. variabilis*).

One human strain (249) was isolated from the blood of a 3-year-old child. It was obtained on the tenth day of illness and the Weil-

[1] From the Typhus Research Laboratory, Savannah, Ga., Division of Infectious Diseases, National Institute of Health.

Felix reaction at this time gave complete agglutination with Proteus OX–19 in the 640 dilution.

The other human strain (393) was recovered from the blood of a 10½-month-old girl on approximately the thirteenth day of illness. The date of onset could not be definitely determined in this case. The Weil-Felix reaction on this date was negative and a test made 21 days later was also negative. The child recovered completely.

Only the three strains T308, H249, and H393 were maintained and studied; they were compared with the previously isolated highly virulent tick strain T125. The involvement of the scrotum was noted in one of the guinea pigs originally inoculated with the tick strains, while scrotum reactions developed in the second passage guinea pigs inoculated with the human strains. The scrotal reaction has been observed in all subsequent passages.

The strains were shown to be Rocky Mountain spotted fever virus by the clinical picture in guinea pigs and by cross immunity tests with the tick strain T125. Typical lesions associated with Rocky Mountain spotted fever were found in the brains of several guinea pigs by Senior Surgeon R. D. Lillie.

The clinical picture of the routine passage animals used in the maintenance of the 1939 highly virulent tick strain T125 and the 1940 isolations is summarized in table 1.

TABLE 1

Strain	Isolated	Number of guinea pigs	Average incubation period (days)	Scrotal reactions	Fatality	
					Number	Percent
Human 393	Georgia 1940	42	2.00	39	31	73.8
Human 249	do	83	2.27	76	58	69.9
Tick 308	do	49	1.94	47	35	71.4
Tick 125	Georgia 1939	132	2.09	122	93	70.4

SUMMARY

Strains of Rocky Mountain spotted fever virus were isolated from ticks (*D. variabilis*) and humans in Georgia in 1940. They were found to be as highly virulent as previously isolated tick strains.

ACKNOWLEDGMENT

We are indebted to the following physicians of Georgia for assistance in procuring the blood specimens: Drs. E. A. Goldman and J. J. Lott, Dr. Frank Thomas, and Dr. C. A. Colson.

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DISABLING MORBIDITY AMONG MALE AND FEMALE INDUSTRIAL WORKERS DURING 1941, AND AMONG MALES DURING THE FIRST QUARTER OF 1942 [1]

By WILLIAM M. GAFAFER, *Senior Statistician, United States Public Health Service.*

The quarterly reports for the year 1941 on the frequency of sickness and nonindustrial injuries causing disability for 8 consecutive calendar days or longer among a group of over 220,000 male members of 26 industrial sick-benefit organizations have appeared (*1–4*), the organizations including sick-benefit associations, group-insurance plans, and company relief departments. The present report records the experience among both males and females for the year 1941, and among males for the first quarter of 1942. The last report of the series referring to the experience among females appeared in 1941 (*1*).

The year 1941.—Table 1 shows by cause and sex the frequency of cases per 1,000 industrial workers for the year 1941 and earlier years. A comparison of the frequencies for males during 1941 with the corresponding frequencies covering the 5-year period, 1936–40, shows the following noteworthy differences: The 22 percent increase in bronchitis, the 28 percent increase in pneumonia, and the 20 percent increase in appendicitis.

The corresponding comparison for the females reveals a 30 percent increase in appendicitis, a 38 percent increase in diseases of the heart and other circulatory diseases, and a 41 percent increase in infectious and parasitic diseases. Thus each sex shows an increase in appendicitis.

It is noteworthy that while the total frequency for 1941, 1936–40, and 1940, respectively, is approximately 60 percent greater among the females than among the males, there are certain causes and cause groups that show for each of the 3 time periods lower rates among the females; these are pneumonia, diseases of the stomach except cancer, hernia, diseases of the heart, cancer all sites, and the rheumatic group.[2] For each of the 3 time periods striking excesses in rate are shown by the females when compared with the males by influenza and grippe,

[1] From the Division of Industrial Hygiene, National Institute of Health

[2] Summation of neuralgia, neuritis, and sciatica, rheumatism, acute and chronic, and diseases of the organs of locomotion except diseases of the joints.

TABLE 1.—*Frequency of cases of sickness and nonindustrial injuries lasting 8 consecutive calendar days or longer among male and female employees in various industries, by cause, experience of 1941 and 1940, and the 5 years, 1936–40*

Cause (numbers in parentheses are disease title numbers from the International List of Causes of Death, 1939)	Annual number of cases per 1 000 persons					
	Males			Females		
	1941	1936–40 [1]	1940	1941	1936–40 [1]	1940
Sickness and nonindustrial injuries [2]	101 3	91.6	96.4	163.3	145.9	153.8
Percent of female rate	*62*	*63*	*63*			
Percent of male rate				*161*	*159*	*159*
Nonindustrial injuries (169–195)	12.0	11.3	11.8	13 9	13.0	14.0
Sickness [2]	89 3	80.3	84.6	149.4	132.9	139.3
Respiratory diseases	40 8	34.5	37.7	63 1	60 3	63.5
Influenza and grippe (33)	18.9	16.1	17.5	28.0	27 1	27.7
Bronchitis, acute and chronic (106)	5 6	4.6	5 2	7.1	7.6	8.2
Diseases of the pharynx and tonsils (115b, 115c)	5.5	4.8	4.9	12 0	12 3	12 7
Pneumonia, all forms (107–109)	3.7	2.9	3.6	.7	1.7	1 8
Tuberculosis of the respiratory system (13)	.7	.8	.7	.7	.7	.6
Other respiratory diseases (104, 105, 110–114)	6.4	5.3	5.8	14 6	10.9	12.5
Nonrespiratory diseases	45 6	43.4	44 8	81 8	68 2	71 8
Digestive diseases	15 4	13.7	14 4	26 9	22 4	21 7
Diseases of the stomach except cancer (117, 118)	4.2	3 8	3 9	2 7	2 2	1.2
Diarrhea and enteritis (120)	1 5	1 2	1.4	2 9	2.2	2.4
Appendicitis (121)	5.3	4 4	5.0	15 6	12.0	12.1
Hernia (122a)	1.5	1.6	1.5	.2	.4	.3
Other digestive diseases (115a, 115d, 116, 122b–129)	2.9	2.7	2.6	5.5	5.6	5.7
Nondigestive diseases	30.2	29.7	30.4	54 9	45 8	50.1
Diseases of the heart (90–95)	2.5	2.7	2 9	1 8	1 4	1 7
Other circulatory diseases (96–103)	3.6	3.3	3 7	4 7	3 3	3.6
Nephritis, acute and chronic (130–132)	.4	4	4	5	4	.6
Other genitourinary diseases (133–139)	2 4	2.4	2.7	10 6	9 3	10.2
Neuralgia, neuritis, sciatica (87b)	2 0	2.2	2.3	2.5	2 1	2 6
Neurasthenia and the like (part of 84d)	1.0	1.0	1.1	6.2	5.7	5.4
Other diseases of the nervous system (80–85, 87, except part of 84d, and 87b)	1.3	1 1	1.0	1 3	1 0	1 5
Rheumatism, acute and chronic (58, 59)	3 7	3 9	4.0	3 3	3 1	3.1
Diseases of the organs of locomotion except diseases of the joints (156b)	2 8	2 9	2.8	2 4	1 6	2.2
Diseases of the skin (151–153)	2 7	2 9	2 5	3 9	3.1	3.4
Infectious and parasitic diseases (1–12, 14–24, 26–29, 31, 32, 34–44) [3]	2.5	2.2	1.8	4 1	2 9	2.6
Cancer, all sites (45–55)	.5	.5	.6	3	.4	.5
All other diseases (56, 57, 60–79, 88, 89, 140–150, 154, 155, 156a, 157, 162)	4.8	4.2	4.3	13 3	11.5	12.7
Ill-defined and unknown causes (200)	2 9	2 4	2.1	4 5	4 4	4 0
Number of person-years, all reporting organizations	257,726	955,268	216,621	18,008	78,966	16,318
Number of organizations	29		29	24		24

[1] Average of the 5 annual rates.
[2] Industrial injuries, venereal diseases, and a few numerically unimportant causes of disability are not reported.
[3] Except influenza, respiratory tuberculosis, and the venereal diseases.

diseases of the pharynx and tonsils, diarrhea and enteritis, appendicitis, and neurasthenia and the like.

The years 1932–41.—A review of the sex-specific frequency rates for the 10 years, 1932–41, discloses that the year 1941 has recorded for it some unusually high rates. For the males the frequency of sickness and nonindustrial injuries begins with 97.5 in 1932, drops to 78.1 in 1934, rises to 99.5 in 1937, decreases to 82.3 in 1938 and gradually rises to 101.3 in 1941, the last rate being 12 percent greater than the 10-year mean of 90.2. For the females, on the other hand, the corresponding rate begins with 158.4, passes through 2 low values of 131.3

TABLE 2.—*Frequency of cases of sickness and nonindustrial injuries lasting 8 consecutive calendar days or longer among* MALE *employees in various industries, by cause, the first quarter of 1942 compared with the first quarters of 1941 and 1940* [1]

Cause (numbers in parentheses are disease title numbers from the International List of Causes of Death, 1939)	Annual number of cases per 1,000 males for the first quarter		
	1942	1941	1940
Sickness and nonindustrial injuries [2]	121 3	139.7	134.8
Nonindustrial injuries (169-195)	11 9	11 6	12.6
Sickness [3]	109.4	128.1	122.2
Respiratory diseases	57.1	79.7	69.9
Influenza and grippe (33)	24.5	51.1	39.4
Bronchitis, acute and chronic (106)	9.2	7.9	8.7
Diseases of the pharynx and tonsils (115b, 115c)	5.8	5.6	6.1
Pneumonia, all forms (107-109)	7.2	5.9	6.2
Tuberculosis of the respiratory system (13)	6	.5	.7
Other respiratory diseases (104, 105, 110-114)	9.8	8.7	8.8
Nonrespiratory diseases	50 1	45.3	50.1
Digestive diseases	15 7	14.5	15.4
Diseases of the stomach except cancer (117,118)	4.3	3.9	4 1
Diarrhea and enteritis (120)	1.5	1.2	1.4
Appendicitis (121)	5 2	5 0	5 5
Hernia (122a)	1.7	1 6	1 4
Other digestive diseases (115a, 115d, 116, 122b-129)	3.0	2.8	3 0
Nondigestive diseases	34 4	30 8	34 7
Diseases of the heart and arteries, and nephritis (90-99, 102, 130-132)	4.6	4.7	5 2
Other genitourinary diseases (133-138)	2.4	2.1	3 0
Neuralgia, neuritis, sciatica (87b)	2.2	2 1	2 9
Neurasthenia and the like (part of 84d)	.9	.8	1 1
Other diseases of the nervous system (80-85, 87, except part of 84d, and 87b)	1.2	1 2	1 2
Rheumatism, acute and chronic (58, 59)	3 9	4 7	4.6
Diseases of the organs of locomotion except diseases of the joints (156b)	3.4	3 0	3 4
Diseases of the skin (151-153)	2.3	2.3	3 2
Infectious and parasitic diseases [3] (1-12, 14-24, 26-29, 31, 32, 34-44)	3.4	2.4	2 2
All other diseases (45-57, 60-79, 88, 89, 100, 101, 103, 154, 155, 156a, 157, 162)	10.1	7.5	7 9
Ill-defined and unknown causes (200)	2.2	3 1	2 2
Average number of males covered in the record	253,500	218 021	196 766
Number of organizations	22	22	28

[1] The same 22 organizations are included in 1942 and 1941.
[2] Industrial injuries, venereal diseases, and a few numerically unimportant causes of disability are not reported.
[3] Except influenza, respiratory tuberculosis, and the venereal diseases.

(1933) and 130.4 (1938), and rises to its highest value, 163.3, in 1941, this rate being 11 percent in excess of the 10-year mean of 147.1. Rates for males for 1941 that have never been equalled or exceeded in the 10-year period are those for bronchitis (5.6), pneumonia (3.7), and appendicitis (5.3); these rates exceed the corresponding 10-year means by 33 percent, 42 percent, and 26 percent, respectively. The frequency of interest for the females is that for appendicitis which in 1941 reached the value of 15.6; during the 10-year period this value was never equalled or exceeded and is 37 percent in excess of the 10-year mean of 11.4.

Case duration.—The inclusion of sex-specific data on individual case duration in the reports from most of the industrial sick benefit organizations makes possible the examination of the frequency of cases disabling for a specified number of days or more. A comparison of these frequencies for sickness and nonindustrial injuries, and specific

cause groups, with the corresponding frequencies published for the year 1940 (*1*) shows no striking differences.

First quarter of the year 1942.—The morbidity experience among males for the first quarter of 1942 as compared with the corresponding quarter for 1941 and 1940 is shown in table 2. Attention is directed to the relatively low rate for influenza and grippe for 1942 (24.5), which represents a decrease of 52 percent when compared with the epidemic rate for 1941 (51.1), and a difference of 30 percent below the corresponding mean for the first quarters of the 10 years 1933–42. Bronchitis and pneumonia, however, show increases of 16 percent and 22 percent, respectively, when compared with the preceding year. In fact, an inspection of the first quarter rates for the past 10 years shows that the 1942 rates for bronchitis (9.2) and pneumonia (7.2) have never been exceeded or equaled, bronchitis showing an excess of 37 percent and pneumonia one of 57 percent when related to their respective 10-year means, 6.7 and 4.6.

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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

July 19–August 15, 1942

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended August 15, the number reported for the corresponding period in 1941, and the median number for the years 1937–41.

DISEASES ABOVE MEDIAN PREVALENCE

Influenza.—The number of cases (1,396) of influenza reported for the 4 weeks ended August 15 was only about one-half of the number reported during the corresponding week in 1941, but it represented a slight increase over the 1937–41 median incidence. Each region

except the South Atlantic and West South Central contributed to the increase. The relatively high incidence of this disease in 1941 was largely due to an excess of cases in the State of Texas; the number of cases reported from that State during the current period was 315, as compared with 1,294 last year.

Meningococcus meningitis.—For the current period there were 210 cases of meningococcus meningitis reported, as compared with 116 for the corresponding period in 1941 and an average of 122 cases in the years 1937–41. The relatively high incidence was due to an excess of cases in the Atlantic Coast and Pacific regions. In other regions the number of cases either closely approximated the seasonal expectancy or fell considerably below. For the country as a whole the incidence was the highest recorded for this period since 1937 when 250 cases were reported.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The favorable record of diphtheria continued during the 4 weeks ended August 15. There were 600 cases reported, which marks a new low for this season of the year. The New England and West South Central regions reported a slight increase over the normal seasonal expectancy, but in all other regions the number of cases was relatively low.

Measles.—For the current 4-week period there were 6,928 cases of measles reported, as compared with 12,170 for the corresponding period in 1941 and an average of approximately 8,600 cases in the years 1937–41. The incidence was unusually high in the Pacific region, with minor increases over the expected seasonal incidence in the West North Central and Mountain regions; all other regions reported fewer cases than have normally been recorded for this season of the year.

Poliomyelitis.—The number of cases of poliomyelitis rose from 237 during the 4 weeks ended July 18 to 570 during the 4 weeks ended August 15. Of the total number of cases, Illinois reported 73; Tennessee, 57; Kentucky, 50; New Jersey, 44; Arkansas, 37; Michigan, 26; and New York, 25—more than one-half of the reported cases occurred in those 7 States. For the country as a whole the rate of increase was about normal for this season of the year, but the number of cases was slightly below normal, compared with the experience of preceding years.

Considering the situation in geographic regions, the number of cases (131) reported in the East South Central region was more than 3

times the 1937–41 median figure for that region; the number in the West South Central was one and one-half times the seasonal expectancy, and the North Atlantic regions reported an excess of approximately 20 percent over the normal incidence. In the South Atlantic region where the disease was unusually prevalent at this time last year, the incidence was considerably below the average of preceding years and the number of cases was comparatively low in the West North Central, Mountain, and Pacific regions.

Scarlet fever.—This disease continues at a favorable level. The number of cases (2,582) reported for the current period represents the lowest incidence on record for this period. The number of cases reported from the New England, South Atlantic and South Central regions represented excesses over the 1937–41 median figures, but in other regions the incidence was relatively low.

Smallpox.—The number of cases of smallpox was the lowest on record for this period. The reported cases (16) dropped considerably below even the previous year during which 29 cases were reported.

Typhoid and paratyphoid fever.—The number of cases (995) of typhoid and paratyphoid fever reported was also the lowest incidence of this disease on record for this period. A few more cases than might be expected were reported from the Mountain region, but in all other regions the number of cases was considerably below the average seasonal incidence.

Whooping cough.—The incidence of whooping cough was relatively low, 13,584 cases being reported for the current period, as compared with approximately 16,000 cases for the corresponding period in 1941, an average of approximately 15,000 cases in the years 1938–41. An excess over the seasonal average was reported from the New England and East North Central regions, but in all other regions the disease was considerably less prevalent than in preceding years.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ended August 15, based on data received from the Bureau of the Census, was 10.5 per 1,000 inhabitants (annual basis). The rate was slightly below that for the corresponding period in the two preceding years, but it was a little higher than the 1937–41 average rate (10.2 per 1,000).

Number of reported cases of 9 communicable diseases in the United States during the 4-week period July 19–August 15, 1942, the number for the corresponding period in 1941, and the median number of cases reported for the corresponding period, 1937–41

Division	Current period	1941	5-year median	Current period	1941	5-year median	Current period	1941	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	600	609	1,030	1,396	2,715	1,322	6,928	12,170	8,591
New England	21	17	17	5	3	3	877	1,297	899
Middle Atlantic	52	68	129	18	13	13	1,181	3,336	3,152
East North Central	90	99	136	106	73	91	1,246	2,607	2,571
West North Central	30	51	63	31	26	26	387	467	373
South Atlantic	145	123	219	517	707	526	374	2,269	677
East South Central	85	50	126	85	72	72	89	411	352
West South Central	119	105	107	392	1,370	492	297	605	317
Mountain	14	56	56	161	161	79	693	407	407
Pacific	44	40	73	81	290	55	1,784	771	771
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	210	116	122	570	1,296	783	2,582	2,714	3,117
New England	28	6	6	28	27	16	300	274	200
Middle Atlantic	67	31	31	81	130	71	493	588	637
East North Central	15	13	13	135	146	183	656	779	939
West North Central	8	8	8	40	40	69	307	289	359
South Atlantic	35	22	22	63	490	102	268	228	249
East South Central	18	20	24	131	389	42	172	169	158
West South Central	14	7	16	63	32	42	135	103	112
Mountain	4	5	5	14	12	22	78	80	135
Pacific	26	4	7	15	30	130	173	204	243
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	16	29	178	995	1,199	2,001	13,584	16,099	[3] 15,357
New England	0	0	0	24	23	33	1,414	1,123	937
Middle Atlantic	0	0	0	87	164	164	3,505	2,611	3,825
East North Central	5	10	60	95	136	220	4,311	4,155	4,289
West North Central	6	9	57	52	62	118	682	1,169	859
South Atlantic	0	2	1	222	264	493	1,238	2,351	1,969
East South Central	2	0	4	185	187	337	539	503	567
West South Central	0	3	6	241	264	541	625	1,037	1,027
Mountain	3	4	20	64	53	53	431	1,171	683
Pacific	0	1	31	25	46	66	839	1,979	1,290

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.
[2] Mississippi excluded.
[3] 4-year (1938–41) average.

DEATHS DURING WEEK ENDED AUGUST 22, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug. 22, 1942	Corresponding week, 1941
Data from 85 large cities of the United States:		
Total deaths	7,309	6,977
Average for 3 prior years	6,853	
Total deaths, first 33 weeks of year	272,408	276,203
Deaths per 1,000 population, first 33 weeks, annual rate	11.8	12.0
Deaths under 1 year of age	569	456
Average for 3 prior years	456	
Deaths under 1 year of age, first 33 weeks of year	18,181	16,868
Data from industrial insurance companies:		
Policies in force	64,962,563	64,428,243
Number of death claims	9,750	10,800
Death claims per 1,000 policies in force, annual rate	7.8	8.7
Death claims per 1,000 policies, first 33 weeks, annual rate	9.4	9.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED AUGUST 29, 1942

Summary

For the country as a whole, the incidence of practically all of the communicable diseases for which weekly telegraphic reports are received remained low during the current week. Meningococcus meningitis, however, continues persistently above the 5-year (1937–41) median expectancy and above the incidence in any prior year since 1937. A total of 58 cases was reported, as compared with 42 for the preceding week and with 63 cases for the corresponding week in 1937. The largest numbers of cases are still being reported from the Middle and South Atlantic States.

A total of 202 cases of poliomyelitis was reported as compared with 183 for the preceding week and a 5-year median of 606 cases. The current incidence and the total cases to date this year are below the figures for the corresponding periods of any prior year since 1938. The largest numbers of cases were reported in the Middle Atlantic and East North Central States. Only 4 States reported more than 10 cases—New Jersey 26, Illinois 23, New York 19, and Michigan 11. Tennessee (10) and Kentucky (9) were the only southern States reporting more than 5 cases.

Influenza is slightly above the 5-year median Of the 472 cases reported currently, 128 occurred in Texas, 117 in South Carolina, and 58 in Virginia—64 percent of the total cases occurring in these three States.

Only 2 cases of smallpox were reported (1 in Arkansas and 1 in Idaho). A total of 614 cases has been reported this year to date, as compared with 1,155 last year and a 5-year median of 8,046 cases.

Other reports for the week include 1 case of anthrax in Pennsylvania, 19 cases of infectious encephalitis (8 of equine type in Washington State), 21 cases of amebic dysentery, 249 cases of bacillary (125 in Texas), 224 cases of unspecified dysentery (181 in Virginia), 11 cases of Rocky Mountain spotted fever, 18 cases of tularemia, and 152 cases of endemic typhus fever (54 in Georgia and 45 in Texas). One case of Weil's disease was reported in Maryland and 3 cases of undulant fever were reported in Mississippi.

The death rate for the current week for 88 large cities in the United States is 10.3 per 1,000 population, as compared with 10.4 last week and a 3-year (1939–41) average of 10.0.

Telegraphic morbidity reports from State health officers for the week ended August 29, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41
	Aug. 29, 1942	Aug. 30, 1941		Aug. 29, 1942	Aug. 30, 1941		Aug. 29, 1942	Aug. 30, 1941		Aug. 29, 1942	Aug. 30, 1941	
NEW ENG.												
Maine	0	2	0	-----	-----	-----	6	15	6	0	0	0
New Hampshire	0	0	0	-----	-----	-----	3	0	0	0	0	0
Vermont	1	0	0	-----	-----	-----	24	4	2	0	0	0
Massachusetts	2	1	1	-----	-----	-----	44	38	36	6	1	0
Rhode Island	0	1	0	-----	-----	-----	4	3	4	0	0	0
Connecticut	0	0	0	6	-----	-----	8	18	8	0	0	
MID. ATL.												
New York	9	10	9	[1] 1	-----	[1] 2	52	57	84	6	2	2
New Jersey	1	3	3	5	3	3	36	20	20	5	0	1
Pennsylvania	2	7	13	-----	1	-----	20	69	39	6	2	2
E. NO. CEN.												
Ohio	6	3	8	3	8	2	18	24	20	1	1	1
Indiana	4	8	7	4	3	4	4	5	5	1	1	0
Illinois	9	10	14	8	2	4	13	9	22	1	1	2
Michigan [2]	3	6	6	8	-----	-----	35	9	24	3	2	1
Wisconsin	6	0	1	-----	6	20	44	43	39	1	0	0
W. NO. CEN.												
Minnesota	1	2	2	-----	-----	1	6	1	2	0	0	0
Iowa	5	2	2	-----	1	-----	4	4	8	0	0	1
Missouri	0	6	6	-----	1	1	8	6	2	2	0	1
North Dakota	0	0	2	5	-----	-----	1	6	1	0	0	0
South Dakota	4	9	0	-----	-----	-----	2	8	1	0	0	0
Nebraska	0	0	0	7	-----	-----	10	2	3	0	0	0
Kansas	1	3	2	2	-----	1	9	17	11	0	0	0
SO. ATL.												
Delaware	0	0	0	-----	-----	-----	0	0	0	1	0	0
Maryland [2]	1	1	1	3	2	2	11	16	10	7	1	1
Dist. of Col	2	0	2	-----	-----	-----	1	6	3	1	0	0
Virginia	9	5	18	58	8	8	3	4	10	1	5	1
West Virginia	5	5	5	1	-----	8	0	21	2	1	2	1
North Carolina	26	32	32	-----	-----	-----	6	12	12	0	1	1
South Carolina	16	10	10	117	43	90	2	10	10	0	2	1
Georgia	8	18	20	1	19	1	0	28	2	0	0	0
Florida	0	1	3	10	6	3	2	4	2	0	0	0
E. SO. CEN.												
Kentucky	6	7	9	1	1	3	0	8	8	1	1	0
Tennessee	8	9	9	8	2	9	3	2	7	1	1	1
Alabama	14	18	17	12	6	6	6	16	17	3	1	1
Mississippi [2]	5	11	12	-----	-----	-----	-----	-----	-----	3	0	0
W. SO. CEN.												
Arkansas	10	7	8	12	2	5	0	14	5	0	0	0
Louisiana	2	0	5	8	-----	5	1	3	1	0	1	1
Oklahoma	1	7	7	6	6	10	4	2	3	0	0	0
Texas	11	27	23	128	329	98	33	48	16	3	1	1
MOUNTAIN												
Montana	3	2	2	-----	-----	-----	9	3	6	0	0	0
Idaho	0	0	0	-----	-----	-----	17	3	1	0	0	0
Wyoming	5	0	0	8	4	-----	6	0	0	0	0	0
Colorado	2	1	4	13	20	-----	8	14	14	0	1	1
New Mexico	1	0	2	-----	-----	-----	3	5	5	0	0	1
Arizona	0	1	1	26	30	18	6	10	3	0	0	0
Utah [2]	0	0	0	-----	1	-----	21	3	6	1	0	0
Nevada	0	0	-----	-----	-----	-----	0	0	-----	0	0	-----
PACIFIC												
Washington	1	2	2	-----	-----	-----	42	6	6	0	1	0
Oregon	0	1	1	3	4	5	53	16	9	1	1	0
California	7	5	12	18	16	11	101	90	49	3	0	0
Total	197	243	339	472	524	383	689	692	692	58	29	25
34 weeks	7,623	7,773	12,310	81,270	490,369	160,359	467,273	824,395	348,906	2,454	1,439	1,439

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 29, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Aug. 29, 1942	Aug. 30, 1941		Aug. 29, 1942	Aug. 30, 1941		Aug. 29, 1942	Aug. 30, 1941		Aug. 29, 1942	Aug. 30, 1941	
NEW ENG.												
Maine	1	4	1	6	1	2	0	0	0	2	1	2
New Hampshire	0	2	0	0	0	0	0	0	0	0	1	0
Vermont	1	3	1	1	4	2	0	0	0	0	6	0
Massachusetts	2	21	4	35	52	20	0	0	0	5	3	4
Rhode Island	0	5	1	3	3	2	0	0	0	0	0	0
Connecticut	3	5	0	4	5	6	0	0	0	0	5	4
MID. ATL.												
New York	19	69	60	46	62	54	0	0	0	7	26	17
New Jersey	26	29	8	15	21	17	0	0	0	4	4	4
Pennsylvania	3	65	13	23	32	42	0	0	0	18	23	23
E. NO. CEN.												
Ohio	9	36	21	67	34	35		0	0	5	12	15
Indiana	5	6	6	11	7	21	0	0	0	2	0	6
Illinois	23	31	20	37	43	51	0	0	1	9	10	20
Michigan [3]	11	26	31	23	31	40	0	0	0	3	11	11
Wisconsin	4	3	8	32	24	24	0	0	0	0	4	2
W. NO. CEN.												
Minnesota	3	21	14	9	15	16	0	0	0	1	0	1
Iowa	7	0	4	9	7	13	0	0	0	2	2	3
Missouri	5	5	5	8	14	15	0	0	0	10	9	17
North Dakota	2	0	0	1	2	4	0	0	0	1	0	2
South Dakota	-	3	3	2	11	8	0	0	0	0	0	0
Nebraska	7	0	2	5	3	3	0	0	0	2	1	1
Kansas	2	3	3	13	29	19	0	0	0	3	4	7
SO. ATL.												
Delaware	1	0	0	3	3	0	0	0	0	0	0	0
Maryland [3]	3	32	1	6	9	7	0	0	0	6	6	7
Dist. of Col.	1	8	2	5	6	5	0	0	0	1	1	2
Virginia	1	5	4	9	7	7	0	0	0	12	6	19
West Virginia	2	2	2	15	8	11	0	0	0	6	9	9
North Carolina	4	10	4	22	17	21	0	0	0	15	11	20
South Carolina	4	8	1	2	3	5	0	0	0	5	9	8
Georgia	1	50	4	7	5	8	0	0	0	15	32	28
Florida	0	16	2	5	2	2	0	0	0	6	7	3
E. SO. CEN.												
Kentucky	9	15	4	17	17	17	0	0	0	11	20	30
Tennessee	10	29	4	14	8	12	0	0	0	5	20	17
Alabama	5	65	4	26	11	11	0	0	0	13	6	14
Mississippi [3]	2	12	1	9	6	4	0	0	0	5	18	13
W. SO. CEN.												
Arkansas	5	3	1	1	8	8	1	0	0	12	9	33
Louisiana	2	3	3	2	2	3	0	1	0	6	13	23
Oklahoma	0	2	2	4	3	8	0	0	0	10	14	24
Texas	2	3	8	18	18	18	0	0	0	19	26	40
MOUNTAIN												
Montana	0	3	3	9	6	6	0	0	0	1	2	2
Idaho	1	1	0	0	5	3	1	0	1	1	0	1
Wyoming	1	0	0	2	0	1	0	0	0	0	1	1
Colorado	0	0	3	6	11	8	0	0	0	4	0	5
New Mexico	1	0	1	2	0	1	0	0	0	8	0	4
Arizona	1	2	2	0	0	1	0	0	0	1	1	3
Utah [3]	3	3	2	2	2	4	0	0	0	2	1	2
Nevada	0	0	------	0	0	------	0	0	------	0	1	------
PACIFIC												
Washington	1	0	1	4	8	9	0	0	0	0	3	4
Oregon	0	5	1	5	14	4	0	1	2	1	0	3
California	9	6	13	41	27	44	0	0	1	3	7	7
Total	202	620	606	586	606	666	2	3	34	242	345	479
34 weeks	1,707	4,021	3,258	89,759	90,342	117,179	614	1,155	8,046	4,267	5,105	7,584

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 29, 1942—Continued

Division and State	Whooping cough, Week ended Aug. 29, 1942	Whooping cough, Week ended Aug. 30, 1941	Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
			Week ended August 29, 1942								
NEW ENG.											
Maine	23	19	0	0	0	0	0	0	0	0	0
New Hampshire	0	8	0	0	0	0	0	0	0	0	0
Vermont	57	16	0	0	0	0	0	0	0	0	0
Massachusetts	133	110	0	0	2	0	0	0	0	0	0
Rhode Island	23	12	0	0	0	0	0	0	0	0	0
Connecticut	52	38	0	0	0	0	0	0	0	0	0
MID. ATL.											
New York	305	299	0	1	19	0	2	0	0	0	0
New Jersey	240	88	0	1	0	0	0	0	0	0	0
Pennsylvania	199	192	1	0	0	0	1	0	0	0	1
E. NO. CEN.											
Ohio	179	257	0	0	0	8	0	0	1	1	0
Indiana	30	17	0	0	0	0	0	0	0	0	0
Illinois	261	201	0	0	28	0	0	0	0	1	0
Michigan [2]	231	305	0	0	24	0	0	0	0	0	0
Wisconsin	228	271	0	1	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	61	35	0	2	0	0	0	0	0	0	0
Iowa	13	40	0	0	0	0	0	0	1	0	0
Missouri	7	0	0	0	0	2	0	0	0	0	0
North Dakota	6	13	0	0	0	0	0	0	0	2	0
South Dakota	0	2	0	0	0	0	0	0	0	0	0
Nebraska	7	3	0	0	0	0	0	0	0	0	0
Kansas	45	63	0	0	0	0	1	0	0	0	0
SO. ATL.											
Delaware	0	1	0	0	0	0	0	0	0	0	0
Maryland [2]	48	56	0	0	0	9	1	0	1	0	0
Dist. of Col.	11	15	0	0	0	0	0	0	0	0	0
Virginia	17	10	0	0	0	181	0	0	3	2	0
West Virginia	13	16	0	0	0	0	0	0	0	0	0
North Carolina	41	122	0	0	0	0	0	0	2	2	2
South Carolina	25	61	0	0	0	0	0	0	0	0	6
Georgia	19	19	0	1	5	0	0	0	0	0	54
Florida	4	23	0	0	0	0	0	0	0	0	12
E. SO. CEN.											
Kentucky	35	47	0	1	3	0	0	0	0	0	1
Tennessee	37	30	0	1	0	13	0	0	1	1	2
Alabama	21	25	0	0	0	0	0	0	0	0	23
Mississippi [2]	------	------	0	0	0	0	0	0	0	0	1
W. SO. CEN.											
Arkansas	4	13	0	11	9	0	0	0	0	2	1
Louisiana	5	1	0	1	3	0	0	0	0	0	4
Oklahoma	4	11	0	0	0	0	0	0	0	0	0
Texas	111	149	0	1	125	0	0	0	1	1	45
MOUNTAIN											
Montana	30	32	0	0	0	0	2	0	0	0	0
Idaho	0	27	0	0	0	0	0	0	0	0	0
Wyoming	1	35	0	0	0	0	0	0	0	2	0
Colorado	29	93	0	0	19	0	1	0	0	0	0
New Mexico	17	8	0	0	4	0	1	0	1	0	0
Arizona	12	7	0	0	0	11	0	0	0	0	0
Utah [2]	26	49	0	0	0	0	0	0	0	3	0
Nevada	0	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	12	65	0	1	0	0	8	0	0	1	0
Oregon	16	19	0	0	0	0	0	0	0	0	0
California	129	194	0	1	6	0	2	0	0	0	0
Total	2,767	3,117	1	23	247	224	19	0	11	18	152
34 weeks	125,149	149,416	------	------	------	------	------	------	------	------	------

[1] New York City only.

[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended August 15, 1942

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	2	0	3	0	1	0	2	0	0	0	1	1
Baltimore, Md	0	0	------	0	4	1	8	0	3	0	0	24
Barre, Vt	0	0	------	0	0	0	0	0	0	0	0	0
Billings, Mont	0	0	------	0	0	0	1	0	0	0	0	7
Birmingham, Ala	0	0	2	0	0	0	1	0	1	0	1	7
Boise, Idaho	0	0	------	0	0	0	0	0	0	0	0	0
Boston, Mass	1	0	------	0	19	1	5	1	20	0	0	33
Bridgeport, Conn	0	0	------	0	0	0	0	0	2	0	0	1
Brunswick, Ga	0	0	------	0	0	0	0	0	0	0	0	0
Buffalo, N. Y.	0	0	------	0	5	1	7	0	4	0	0	18
Camden, N. J.	0	0	------	0	0	0	1	0	3	0	0	1
Charleston, S. C	0	0	------	0	0	0	0	1	0	0	0	0
Charleston, W. Va	0	0	------	0	0	0	0	0	0	0	0	0
Chicago, Ill	7	0	------	1	6	0	16	8	18	0	1	180
Cincinnati, Ohio	0	0	1	0	0	0	0	2	3	0	0	19
Cleveland, Ohio	2	0	------	0	1	0	5	1	6	0	0	46
Columbus, Ohio	0	0	------	0	1	0	0	0	4	0	0	10
Concord, N. H	0	0	------	0	0	0	1	0	0	0	0	0
Cumberland, Md	0	0	------	0	0	0	0	0	0	0	0	0
Dallas, Tex	0	0	------	0	1	0	2	0	2	0	0	7
Denver, Colo	2	0	4	0	3	0	3	0	4	0	0	13
Detroit, Mich	2	0	------	0	5	1	2	8	11	0	0	102
Duluth, Minn	0	0	------	0	0	0	0	0	0	0	0	7
Fall River, Mass	0	0	------	0	2	0	0	0	1	0	0	3
Fargo, N. Dak	0	0	------	0	2	0	0	0	0	0	0	0
Flint, Mich	0	0	------	0	0	0	1	0	0	0	0	6
Fort Wayne, Ind	0	0	------	0	0	0	2	0	0	0	0	7
Frederick, Md	1	0	------	0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	------	0	0	0	0	0	1	0	0	0
Grand Rapids, Mich	0	0	------	0	0	0	0	0	2	0	0	4
Great Falls, Mont	0	0	------	0	1	0	0	0	1	0	0	4
Hartford, Conn	0	0	------	0	1	0	0	1	0	0	0	12
Helena, Mont	1	0	------	0	0	0	0	0	0	0	0	0
Houston, Tex	1	0	------	0	0	0	4	0	1	0	1	10
Indianapolis, Ind	0	0	------	0	2	0	5	2	4	0	0	34
Kansas City, Mo	0	0	------	0	0	0	4	0	7	0	0	0
Kenosha, Wisc	0	0	------	0	0	0	0	0	0	0	0	11
Little Rock, Ark	0	0	4	0	0	0	2	0	0	0	0	0
Los Angeles, Calif	2	0	9	0	9	2	3	5	4	0	2	17
Lynchburg, Va	0	0	------	0	1	0	0	0	1	0	0	6
Memphis, Tenn	0	0	------	0	1	0	1	2	0	0	0	33
Milwaukee, Wis	0	1	------	0	29	0	2	0	3	0	0	42
Minneapolis, Minn	0	0	------	0	0	1	0	2	6	0	0	2
Missoula, Mont	0	0	------	0	0	0	1	0	0	0	0	2
Mobile, Ala	0	0	1	0	0	0	1	0	1	0	0	0
Nashville, Tenn	0	0	------	1	0	0	0	2	5	0	0	8
Newark, N. J	0	0	2	0	5	1	4	5	1	0	0	36
New Haven, Conn	0	0	------	0	0	0	0	0	1	0	0	0
New Orleans, La	0	0	3	1	0	4	9	2	2	0	1	0
New York, N. Y	7	2	1	0	8	4	83	8	14	0	9	130
Omaha, Nebr	0	0	------	0	0	0	1	0	0	0	0	2
Philadelphia, Pa	1	1	------	0	11	1	11	0	12	0	4	118
Pittsburgh, Pa	0	0	1	0	1	0	8	0	2	0	0	16
Portland, Maine	0	0	------	0	11	0	2	0	0	0	0	10
Providence, R. I	0	1	------	0	4	0	2	0	1	0	0	13
Pueblo, Colo	0	0	------	0	0	0	1	1	0	0	0	0
Racine, Wis	0	0	------	0	2	0	0	0	1	0	0	5
Reading, Pa	0	0	------	0	0	0	0	0	0	0	1	19
Richmond, Va	0	0	------	0	0	0	2	0	1	0	0	5

City reports for week ended August 15, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Roanoke, Va.	0	0	------	0	0	0	0	0	0	0	1	0
Rochester, N. Y.	0	0	------	0	0	0	4	1	2	0	1	15
Sacramento, Calif.	0	0	------	0	0	0	1	0	0	0	0	0
Saint Joseph, Mo.	0	0	------	0	0	0	1	0	0	0	0	0
Saint Louis, Mo.	2	1	------	0	1	0	6	1	4	0	1	8
Saint Paul, Minn.	0	0	------	0	1	0	3	1	0	0	0	27
Salt Lake City, Utah	0	0	------	0	16	0	0	1	1	0	1	11
San Antonio, Tex.	1	0	------	0	2	0	1	0	0	0	1	3
San Francisco, Calif.	1	0	------	0	8	0	2	0	0	0	1	7
Savannah, Ga.	0	0	6	0	0	0	0	1	0	0	0	3
Seattle, Wash.	0	0	------	0	17	0	2	0	1	0	0	12
Shreveport, La.	1	0	------	0	0	0	4	0	0	0	0	0
South Bend, Ind.	0	0	------	0	0	0	0	0	0	0	0	10
Spokane, Wash.	0	0	------	0	3	0	2	0	0	0	0	2
Springfield, Ill.	0	0	------	0	0	0	0	0	0	0	1	0
Springfield, Mass.	0	0	------	0	3	0	3	0	3	0	0	2
Superior, Wis.	0	0	------	0	1	0	0	0	0	0	0	6
Syracuse, N. Y.	0	0	------	0	13	0	0	2	0	0	0	18
Tacoma, Wash.	0	0	------	0	2	0	1	0	0	0	0	0
Tampa, Fla.	0	0	------	0	0	0	1	0	0	0	0	0
Terre Haute, Ind.	2	0	------	0	0	0	0	0	0	0	0	0
Topeka, Kans.	0	0	------	0	0	0	0	0	0	0	0	4
Trenton, N. J.	0	0	------	0	0	0	3	0	1	0	0	1
Washington, D. C.	0	0	------	0	1	1	5	1	3	0	[illegible]	12
Wheeling, W. Va.	0	0	------	0	0	0	2	0	1	0	1	9
Wichita, Kans.	0	------	------	0	2	0	1	0	0	0	0	1
Wilmington, Del.	0	0	------	0	0	0	1	0	0	0	0	3
Wilmington, N. C.	0	0	------	0	0	0	0	0	0	0	1	5
Winston-Salem, N. C.	2	0	------	0	0	0	2	0	0	0	0	0
Worcester, Mass.	0	0	------	0	0	0	8	0	1	0	2	33

Dysentery, amebic.—Cases: Baltimore, 1; Los Angeles, 2.

Dysentery, bacillary.—Cases: Atlanta, 1; Baltimore, 3; Columbus, 1; Dallas, 1; New York, 9; Philadelphia, 1; Richmond, 2; St. Louis, 8; Detroit, 3.

Dysentery, unspecified.—Cases: San Antonio, 14.

Rocky Mountain spotted fever.—Cases: Baltimore, 1; Lynchburg, 1.

Typhus fever.—Cases: Atlanta, 1; Charleston, South Carolina, 3; Dallas, 1; Houston, 3; New Orleans, 1; San Antonio, 3; Savannah, 1; Winston-Salem, 1.

***Rates** (annual basis) per 100,000 population, for the group of 89 cities in the preceding table (estimated population, 1942, 34,085,159)*

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Aug. 15, 1942	5.81	5.66	0.31	31.82	30.60	25.70	0.00	5.20	158.79
Average, 1937–41	9.43	4.02	1.39	[1] 50.40	38.19	32.31	0.31	9.12	207.62

[1] Median.

PLAGUE INFECTION IN CALIFORNIA

Plague infection has been reported proved in specimens collected in California as follows:

Los Angeles County: July 21, 1942, in a pool of 59 fleas from 11 ground squirrels, *C. fisheri*, taken from the Camp of the Owls in Big Pines Park, and in a pool of 131 fleas from 26 ground squirrels, same species, taken on the premises of Jackson Stables in Big Pine Park.

Monterey County: In pools of fleas, tissue and ticks from ground squirrels, *C. beecheyi*, as follows: July 22, tissue from 1 squirrel taken 5½ miles south and 2½ miles west of Salinas; July 21 and 22, respectively, tissue from 4 squirrels and 16 ticks and 122 fleas from 39 squirrels taken 16 miles south of Salinas.

San Bernardino County: July 16, in a pool of 76 fleas from 18 ground squirrels, *C. fisheri*, taken ½ mile east of Wrightwood.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—During the week ended August 1, 1942, 2 plague infected rats were reported in Honokaa, Paauhau area, Island of Hawaii, T. H., 43.4 and 41.6 miles from the port of Hilo.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended August 1, 1942.—During the week ended August 1, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			1	3	1		1	1		7
Chickenpox	2	13	1	43	105	13	1	22	51	251
Diphtheria	1	12	2	13	3	1	10		1	43
Dysentery				33						33
Encephalomyelitis							1			1
German measles				4	11		4	2	3	24
Influenza		1			1	3	1		[illegible]	8
Lethargic encephalitis						3				3
Measles				18	38	4	14	2	5	81
Mumps		13	2	19	47	17	29	18	100	245
Pneumonia		3			5	1			3	12
Poliomyelitis		4	10	12	1	1				28
Scarlet fever		5	3	33	42	8	10	27	14	142
Trachoma						1				1
Tuberculosis	2	4	4	119	42		16	16		203
Typhoid and paratyphoid fever			3	20	7		2	1		33
Undulant fever				1	2					3
Whooping cough		1		219	65	8	3	3	28	327
Other communicable diseases		5		6	207	26		2	3	249

Province of Alberta—Plague and tularemia infection in fleas.—Under date of August 19, 1942, plague and tularemia infection in fleas, presumably from ground squirrels, was reported as follows: July 22 and August 18, plague infection in flea specimens collected near Suffield.[1] On August 18, tularemia infection was found in a flea specimen collected 35 to 40 miles south of Suffield.

BRITISH WEST INDIES

Trinidad—Port of Spain—Poliomyelitis.—During the period March 1–April 15, 1942, 5 cases of poliomyelitis, with 2 deaths, were reported in Port of Spain, Trinidad.

[1] For recent previous report of plague infection in Alberta Province, see PUBLIC HEALTH REPORTS for July 24, 1942, p. 1112.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Typhus Fever

Algeria.—During the period July 11–20, 1942, 567 cases of typhus fever were reported in Algeria.

Mexico.—During May 1942, six cities in Mexico reported 52 cases of typhus fever, with 12 deaths.

Morocco.—During the week ended August 1, 1942, 134 cases of typhus fever were reported in Morocco.

Rumania.—During the week ended August 8, 1942, 11 cases of typhus fever were reported in Rumania.

Tunisia.—During the period July 11–20, 208 cases of typhus fever were reported in Tunisia (8 cases in Tunis).

* * *

COURT DECISIONS ON PUBLIC HEALTH

City water supply—licensing by State health department of person in charge.—(New Jersey Court of Chancery; *State ex rel. Department of Health of New Jersey* v. *City of Hoboken*, 23 A.2d 587; decided January 9, 1942.) A statute of New Jersey provided that no municipality should appoint any person to be in direct general charge of a water-supply system unless he held a license issued by the State department of health. The term "water-supply system" was not defined in the statute but the State department of health had adopted a resolution defining it as "a system comprising structures which operating alone or with other structures result in the derivation, conveyance (or transmission) or distribution of water for potable or domestic purposes." The regulations of the said department establishing a classification of licenses required in the operation of water-supply systems divided water systems into 4 groups and required licenses for the operation of those systems only which employed purification and treatment. The city of Hoboken obtained its water primarily from the city of Jersey City which supplied it under a contract. Hoboken owned all the water mains and appurtenances within the city and controlled their operation. The process of treatment and purification of the water supplied by Jersey City to Hoboken was completed by Jersey City before the water was delivered to the water mains of Hoboken at the city line dividing the two municipalities. In other words Jersey City supplied water to Hoboken and the latter city merely

distributed it, performing no other function in the premises. The city of Hoboken was governed by an elected board of commissioners and the powers and duties relating to the city's potable water were assigned by the board to the department of revenue and finance of which one of the members of the board was director.

In a suit brought by the State at the relation of the State department of health it was alleged that the city of Hoboken owned a water-supply system and had appointed a superintendent in direct general charge thereof who was not licensed by the department. It was sought to enjoin the city from operating the alleged water-supply system under the supervision of the commissioner until he obtained a license from the department.

The Court of Chancery of New Jersey took the view that the bill of complaint should be dismissed. The city of Hoboken, said the court, was not amenable to the regulations of the State department of health regarding classification of licenses because the evidence showed that the city neither derived its supply of water from any of the sources specified in any of the 4 groups nor did it employ any of the methods of purification or treatment mentioned. It was also pointed out that the State statutes recognized the distinction between a "water-supply" system and a "water-distribution" system and that in the instant case Hoboken merely distributed the water supplied it by Jersey City.

Regarding the city of Hoboken's challenge of the State department of health's right to define what the legislature's term "water-supply system" implied, the court said that the challenge was justified. "Such right to define resides in the courts. When the legislature fails to clarify a term of doubtful meaning, then the courts, if called upon, will define, interpret, or construe the statutory enactment."

According to the court no evidence was offered by the complainant to show that the city of Hoboken had a water-supply system within the intendment and meaning of the statute upon which the suit was based; neither did the legislature ordain that an elected official occupyiug the status which the city commissioner held was required to take out such a license as was mentioned in the said statute.

Ice cream—sale—name and address of manufacturer on wrappers—local board of health regulation upheld.—(Pennsylvania Supreme Court; *Simco Sales Service of Pennsylvania, Inc.*, v. *Brackin et al.*, *Board of Health of Borough of Lansdowne*, 26 A.2d 323; decided May 11, 1942, rehearing denied May 26, 1942.) The regulations of a borough board of health relative to ice cream prohibited false labels, required the name and address of the manufacturer to appear on all wrappers, and provided that no license should issue until the board was satisfied that all State laws and regulations had been complied with and that all permits and licenses required under State laws and regulations had

been obtained. The plaintiff, a corporation engaged in the retail sale of ice cream, applied for a license to sell in the borough ice cream manufactured solely by a particular corporation. The wrappers for the ice cream, however, would not have had the name of the actual manufacturer inscribed thereon but instead would have been so labeled as to make it appear that the ice cream was manufactured by another concern at a stated address. The name of the latter concern was not the name of a corporation or of any individual person doing business under a fictitious name but was one that had been "assumed" or "adopted" by the actual manufacturer as a trade name in the sale of the particular ice cream which was proposed to be retailed by the plaintiff in the borough. In an action of mandamus brought by the plaintiff against the borough board of health to compel the issuance of a license, the board took the position that to issue a license under the circumstances mentioned would result in violations of the board's regulations.

The Supreme Court of Pennsylvania said that, specifically, the narrow question was whether or not the label intended to be used stated the name and address of the manufacturer of the ice cream and answered it by saying that it was clear that the assumed name did not name the manufacturer of the ice cream. "The use of this ficticious name is undoubtedly for the purpose of preventing the public from knowing the name of the real manufacturer, * * *. This is the very thing which the regulation of the board is intended to prevent. If such a practice were permitted it would defeat the purpose of the regulation, which is to prevent fraud or deception in the sale, by giving notice to purchasers of the identity of the manufacturer. Certainly this cannot be accomplished by a label or marker, which conceals the real name of the manufacturer, and gives in its place an assumed, fictitious name."

Passing on to what the appellate court said was the real question for determination, namely, whether the regulation was a reasonable and valid health measure, the court stated that it was of opinion that the regulation was neither arbitrary nor capricious and that it was a reasonable health measure designed to protect the public. In this connection it was said, among other things, that the rule was a common device to insure wholesomeness of a given product and was not peculiar to the board of health of the borough. The reasons for such a regulation were apparent as it was an impossibility to have every package of ice cream inspected before it was sold and, by having this type of regulation, the task of discovering the origin of defective products was made easier. Also it tended to make a manufacturer more careful in guarding against contamination if he knew that his name must appear on each product he offered to the public for consumption.

The fictitious concern had been licensed under a State statute as an ice cream plant operator by the State department of agriculture. This statute prohibited the sale of any ice cream which was falsely labeled as to the name and address of the manufacturer or which failed to disclose such name and address. The supreme court did not concede that the action of the department in granting the license was proper under the circumstances. After stating the statutory provisions the court said that "This makes it appear that the issue of the license to the plaintiff by the department of agriculture was a mistake, being in violation of" the statute. There was also pointed out another statute which prohibited the sale of ice cream, among other milk products, not bearing prominently the name and address of the manufacturer and the name and location of the milk plant in which manufactured.

Finally the court held that there was no merit in the plaintiff's contention that the license should be issued regardless of the validity of the board of health regulation inasmuch as the ice cream proposed to be sold would be identical with other ice cream sold by the actual manufacturer. According to the court the reason for the use of the proposed label, though a business one, was to conceal from the public the name of the manufacturer rather than to disclose it, and "Were such a practice permitted, there would be nothing to prevent irresponsible persons from engaging in the same type of fraud on the public with most serious consequences apt to follow. There is no compelling reason why a license should be granted to a seller of ice cream whose product is falsely labeled."

Swine—keeping—permit from local board of health.—(New Jersey Supreme Court; *Lichtman* v. *Board of Health of Deptford Township et al.*, 26 A.2d 503; decided June 3, 1942.) In a mandamus proceeding to compel a township board of health to issue a permit to the relator to keep swine on his farm it appeared that his application was refused because he had previously been convicted of keeping swine without a permit and because the board of health did not intend to issue more permits. These grounds were held by the Supreme Court of New Jersey to be without merit because the conviction involved no moral turpitude and because all the adjoining farms were operated as piggeries, there being 85,000 pigs in the township. The exclusion of relator, said the court, from this prevailing business was arbitrary and could in no way promote the public health, safety, and welfare.

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FEDERAL SECURITY AGENCY

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LOCATION AND MOVEMENT OF PHYSICIANS, 1923 AND 1938—GENERAL OBSERVATIONS [1]

By JOSEPH W. MOUNTIN, *Assistant Surgeon General*, ELLIOTT H. PENNELL, *Statistician*, and VIRGINIA NICOLAY, *United States Public Health Service*

Where are physicians likely to locate? How long do they remain in the same place? To which types of communities do they tend to migrate? In the answers to these and similar questions may be found a partial explanation of one problem associated with medical care, namely, the availability of professional skill. This and allied subjects have given rise to spirited discussions and an extensive literature.

Under a laissez-faire scheme of economy, it is to be expected that pecuniary reward will be a potent influence in determining the distribution and movement of physicians. Some apologists for the present dispensation even say, in effect, "Wherever a physician can earn a livelihood, there you will find a physician." The direct counterpart of this statement would be that a physician will not settle in a community where he cannot make a living. Other factors which no doubt affect the distribution of physicians are the facilities afforded by the community in the way of accessories to living and medical practice, such as schools, roads, hospitals, and professional associates. From the standpoint of actual or potential patients, medical resources present quite a different aspect. All substantial morbidity studies have shown that underprivileged groups experience illness more frequently than those higher on the economic scale. Accordingly, communities with large proportions of the population in the low income groups are at a disadvantage in attracting physicians, even though their needs for medical service are great. These influences may be multiple and varied for one community as contrasted with another. It should be of interest to determine the degree to which needs for service and medical resources have become adjusted spontaneously under the free play of social and economic forces.

While the availability of physicians has been a subject of considerable study, relatively few factual data of a quantitative character have

[1] Assistance in the preparation of these materials was furnished by the personnel of Work Projects Administration Official Project No. 65-2-23-356.

appeared in the literature which would serve to measure either the influence of factors involved in this distribution or the changes that have taken place within recent years. The United States Public Health Service, through a grant from the Work Projects Administration, had the good fortune of being enabled to peruse the mass of basic data contained in the several issues of the American Medical Directory (*1*) published by the American Medical Association during the period 1923 through 1938. This represents the longest period for which a continuous series of directories was available at the time the study was initiated. Among data included for each physician in a directory are the year of birth, year of graduation in medicine, specialty, type of service, and office address. Reports published by the United States Department of Commerce furnished population figures (*2*, *3*) and economic indices (*4*) for the several States. The Hospital Register (*5*) of the American Medical Association provided statistics pertaining to hospital accommodations. A combination of data from these sources supplied the material from which this preliminary analysis evolved.

There were about 227,000 physicians listed in the directories at one time or another during the period under consideration. In preparing for this study, the information published for the individual physicians in each directory in which their names appeared was posted on single file cards. From the material so assembled a tabulation card was punched for each physician. Thereon were coded data published for four index years; those chosen were the first, second, and last year of listing, and the year 1931 if his name appeared in that directory. In addition, specific items were coded for selected characteristics of the State, county, and city in which his office was located. A particular section of the punched card was used for the summarization of the number of listings recorded, and the number of intercity, intercounty, and interstate changes, which were implied by the one or more business addresses given in the directories in which his name appeared.

The number of changes in location made by physicans has been used to express their movement from one place to another. As the different listings in the several directories afford the sole criterion of change, the count of moves made in this way perhaps infers some understatement of the changes that actually occurred. Some physicians may have made more than one change between two consecutive directory listings. Moreover, the changes made by physicians before their first listings in the 15-year period are beyond possibility of enumeration from the sources available. It is believed, however, that the great majority of physicians whose names were first recorded after 1923 represent recent graduates.

LOCATION OF PHYSICIANS, 1923 AND 1938

As expressed in terms of physicians per unit of population, the potential medical service available in the continental United States was essentially the same in 1938 as in 1923. In both years there were 131 physicians per 100,000 population (equivalent to 764 persons per physician) in the country, indicating that the total net change in the number of physicians was proportional to the change in population. However, some fluctuation in this ratio was evident at various intervals within the 15-year period. Leland (*6*) records a slight decline in the number of physicians per 100,000 population from 1923 to 1929, followed by an increase up to 1934. While gross totals may not accurately represent the number of physicians who give medical service directly to patients, such totals should provide a satisfactory measure of the general availability of physicians' services for comparisons between States. Of those physicians listed in the 1938 directory,[3] 81 percent were designated as engaged in private practice. An additional 9 percent either rendered service as interns and residents, or were active in some other capacity in hospitals, infirmaries, dispensaries, or teaching clinics. Of the others, 5 percent were employed in Federal service or other professional work not involving private practice, and 5 percent were designated as retired or otherwise not active. While comparable data are not readily available for other years, it is believed that variations in these proportions during the 15-year period are of insufficient consequence to limit seriously the use of gross totals as indices in the comparisons that follow. Throughout the study, therefore, physicians in the aggregate have been construed to express professional resources.

It is recognized that the population unit served by a physician is variable. For this reason, any analysis of the extent and trend of medical resources on the basis of data assembled from State totals can be considered in only a general way. On the other hand, State totals represent composites of local situations and reflect the behavior of those groups in the population that predominate within the State. Consequently, it is purposed to present the findings resulting from preliminary tabulations on a State basis. These disclosures will be investigated further in later reports dealing with data for local areas.

Differences in the physician-population ratio which exist among the various areas of the country are masked by the ratio for the United States as a whole. Marked variations in the degree of professional resources are manifest when the States are grouped into four

[3] Percentages based upon total number of physicians in the United States in 1938 as published by the American Medical Association (7).

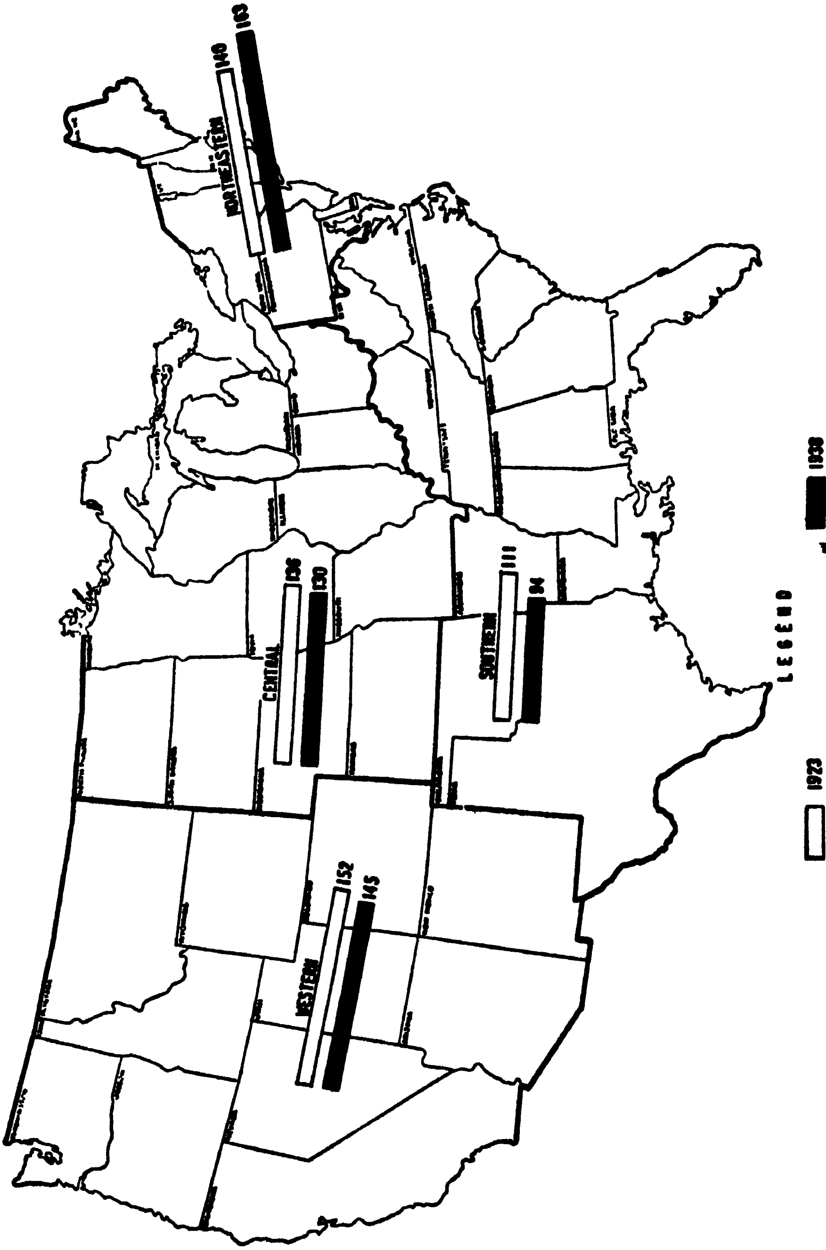

FIGURE 1.—Physicians per 100,000 population 1923 and 1938 for States in four broad geographic areas of the United States.

geographic sections,[3] namely, the Northeastern, Southern, Central, and Western (figure 1). On the assumption that the gross ratio of physicians to population represents an index of the availability of their services to the general population, the amount of physicians' services available to those persons residing in the Southern States is much more limited than in other areas. In 1923 there were 111 physicians per 100,000 population in the Southern group as contrasted with 152 in the Western, 140 in the Northeastern, and 136 in the Central region. When these computations are converted into persons per physician the figures are, respectively, 904, 661, 717, and 738. By 1938, however, the situation had changed materially. In this year, 163 physicians per 100,000 population in the Northeastern area indicated greater medical resources than existed in any other geographic group of States, whereas in the Southern area the number had been decreased to 94. Although the Western and Central regions likewise experienced decreases in the physician-population ratio, the net losses were not large. To paraphrase, the situation in areas sustaining the less favorable provisions of physicians in 1923 had become even worse by 1938, whereas in areas maintaining the more generous provisions for medical care, these resources were considerably increased over the 15-year period: the situation in 1923 represented a more equable distribution than that which existed in 1938.

Obviously, there must be factors which influence physicians in their selection of locality. Among those that are commonly thought to govern this distribution are the economic, as associated with financial gain, and the professional, as related to physicians' opportunities to practice medicine as they think best for themselves and the general population. Effective per capita income has been selected as the most apparent and proper measure of the ability of individuals to purchase professional services. States ranking high in this index, however, are not only those which evince the higher degrees of urbanization, but also those that realize the more generous medical facilities. In this latter category may be included hospitals and clinics, and the presence in the community of physicians who restrict their practices to specialized medicine and avail others of consultation service. Medical schools, though not of major importance, should not be overlooked. In its annual presentation of educational data, the Council on Medical Education and Hospitals published a table

[3] The established geographic areas with the States contained therein are as follows:

Northeastern: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia.

Southern: Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas.

Central: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas.

Western: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, and California.

showing from which States the students came who were in attendance at each medical college during the session of 1922 to 1923. From this study "the influence of the proximity of the medical school is seen in the fact that States having medical colleges contribute more students in proportion to the population than those which have no colleges" (*8*). In 1910, Dr. Abraham Flexner (*9*) acknowledged the tendency for students to study medicine in their own States or in States located within the same geographic section of the country. No doubt there is also some inclination on the part of physicians to enter practice in or near the city in which they served their hospital internships. Finally, the increase or decline of population within States affords an index of the extent to which the potential patient load for all physicians may have varied over the period.

In view of the significant influence which urban character, hospital facilities, and population change appear to exercise upon the distribution of physicians in the several geographic sections of the country, the States have been classified successively on these characteristics and data are presented to demonstrate the differences associated with these factors. Income has not been omitted from consideration but because of its close correlation with urban character, the latter has been used as the criterion to illustrate their allied influence.

Previous studies of physician distribution (*6, 9, 10, 11, 12*) reveal a striking increase in the number of physicians practicing in urban

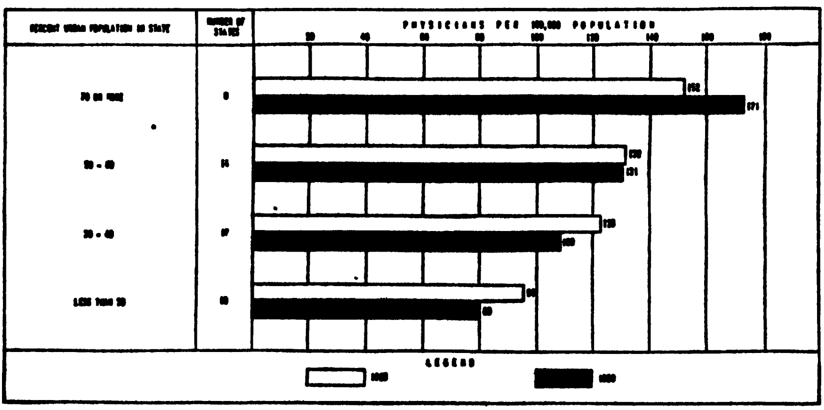

FIGURE 2.—Physicians per 100,000 population in 1923 and 1938 for States of different urban character.

centers and a corresponding decline in the number engaged in rural practice since the beginning of this century. Data for 1923 and 1938 are consistent with this trend (figure 2). For both years there was a high degree of association between the urban character of a State and the amount of physicians' services available therein. The physician-population ratio was large when the percentage of urban population

was high, and as States were characterized by smaller fractions of their population in the urban category the ratio declined in a progressive manner. That the factors associated with urban character had become increasingly potent in determining the relative number of physicians in States is indicated by a greatly broadened spread of the ratios for 1938 as contrasted with 1923. The physician-population ratio for the most urban States exceeded that in the most rural group by more than one-half in 1923. During the study period the ratio for the former had been increased and for the latter had been diminished until the one was more than twice as great as the other. It would thus appear that large urban populations with their concomitant high incomes and relatively plentiful accessory facilities for the practice of medicine have proved increasingly attractive to physicians establishing practice during recent years.

For further analysis, the urban and rural States[4] have been subdivided on the bases of (a) beds in general hospitals per 1,000 population in the State in 1930, and (b) percentage of population change over the period 1920 to 1940 (figure 3).

The amount of hospital facilities in States appeared to have an important bearing upon the distribution of physicians, although this

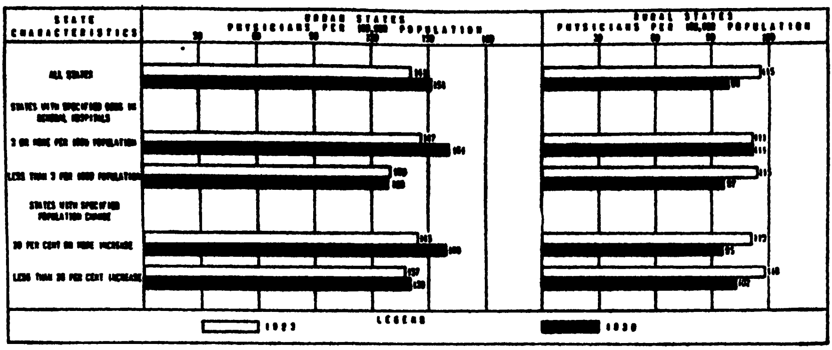

FIGURE 3.—Physicians per 100,000 population in 1923 and 1938 in urban and rural States (a) with different hospital facilities in 1930 and (b) with different population change from 1920 to 1940.

influence was less apparent in those States predominantly rural in character. The presence of large numbers of beds in general hospitals not only reflects a greater physician-population ratio for urban States than for any other group of States, but it is also associated with an increase of about one-tenth in this ratio over the period. Even in those urban States where there were fewer hospital beds, the physician-population ratio in 1923 was still considerably higher than for either group of rural States and was maintained at the same level in 1938. For rural States with large numbers of hospital beds, the ratio was

[4] States in which 50 percent or more of the population was enumerated in urban areas in 1930 are classified as urban States; all other States are classified as rural States.

lower than for either urban group, but it remained at the same level in both years. For that group of rural States having less numerous hospital beds, the ratio for the earlier year had declined by 1938 to a value which was below that for any other group.

The influence of population change varied between urban and rural States. In the urban States, large population increase (20 percent or more) was associated with a high ratio of physicians to population for both 1923 and 1938, with a considerable increase over the period (145 to 160). The average (137) for urban States with less than 20 percent increase in population was somewhat lower in 1923 than for corresponding States with large increases, and it remained at about the same level in 1938. In rural States, on the other hand, both large and small population increases were associated with low ratios in 1923 (110 and 118 respectively) and with losses of about one-seventh over the period. Contrary to the findings for urban States, the ratio was at a somewhat higher level for both years in States with small population increases as contrasted with those expanding 20 percent or more. A reasonable deduction to draw from these comparisons is that physicians, like other groups of the population, are being drawn to the cities, while the increase in population of the less wealthy States through high birth rates offers little or no inducement to physicians seeking opportunities to practice medicine.

PHYSICIANS MAKING INTERSTATE CHANGES

Although the foregoing delineation regarding availability of physicians represents a remarkable synthesis of distribution and attendant characteristics, the significance of the existing conditions assumes greater prominence when supplemented by a discussion of the extent to which physicians in a State have moved thereto during the 15-year period. In the movement of all population groups are contained many points of economic and social importance, but in the case of physicians this phenomenon was explored to determine what factors might be operative and the extent to which normal migration might be relied upon to correct inequalities in the availability of professional services. Determination of this behavior entailed a count of those physicians showing no movement that involved crossing State lines, and those changing locations in this way one or more times during the study period.

Interstate movements have been chosen for presentation on this occasion. Such movements are likely to represent, in the main, initial adjustments. After graduation a physician usually moves to a hospital to complete his training, and within a year or two goes to a place to pursue his professional career. Depending upon emoluments and opportunities offered by the community, and personal character-

istics of the individual, he may move subsequently before becoming settled. For a few States, the interstate change incident to final retirement may be an important factor, though it is probably of little significance in the national picture.

Of the physicians listed in the 1938 directory, 18 percent had made one or more interstate changes during the preceding 15-year period. The findings for the several geographic areas show rather remarkable variations which do not parallel those so far described. An average of 29 percent of the physicians in Western States had moved from some other State during the period, a proportion which was one-third greater than that for States in the Southern group, and almost twice as great as that prevailing in the Northeastern and Central regions.

The proportion of physicians who had recently moved from other States seems to be associated with urban character in an inverse way. Data for predominantly urban States reflected only 17 percent of physicians who had moved from other States, while in rural States the corresponding proportion was 22 percent.

Variation in the amount of hospital facilities in urban States did not seem to influence the movement of physicians to a great extent. However, the proportion of physicians in rural States who had moved from other States was 26 percent where hospital facilities were plentiful (3 beds or more per 1,000 population), and 21 percent where they were less generous (less than 3 beds).

Expanding populations in both urban and rural States were associated with high proportions of physicians coming from other States. In the urban group showing population increases of 20 percent or more, 19 percent of the physicians had moved from another State within the preceding 15 years, whereas in States showing small population gains, 14 percent had made changes. In rural States showing large population increases 24 percent had moved from other States, and where the increase was smaller 21 percent had changed locations.

Disclosures resulting from the above-described classifications would indicate that greater fractions of physicians have been attracted from outside the State in rural States than in urban States. The high and expanding physician-population ratios in the most urban group, as revealed in the preceding section, suggest that the educational and training facilities are such that, in a large part, physicians receive their education and special training in these States and establish practice therein without interstate migration, whereas rural States with the more restricted facilities must depend upon migration from other States to maintain the number of physicians at an existing level. In fact, the findings suggest that in rural areas the features which attract physicians were too limited to maintain a constant number over the study period.

NEW REGISTRANTS

Consensus of opinion acknowledges that, other factors being equal, the more favorable situation is evident in those localities that realize the greater numbers of young or middle-aged physicians in relation to their needs. The presence of a large proportion of young physicians assures reserves for future medical aid and reduces somewhat the problem of recruitment to maintain or improve the level of adequacy which exists at a given time. In order to ascertain the extent to which variation in such physician reserves may be associated with the State characteristics selected for study, it seemed apposite to investigate further the distribution of physicians in 1938 by discriminating between those who were graduated recently and others whose graduation had occurred prior to 1923. Differentiation of ages on these bases was effected by counting those who were listed in both the 1923 and 1938 directories, and others who were listed in 1938 but who were not listed in 1923. This was done on the assumption that the former group was comprised of those who had entered the professional field 15 or more years ago, while the latter group included, principally, recent graduates. Of the total 169,628 physicians listed in the 1938 directory, 75,267, or 44 percent, were classified as young physicians on the basis of this separation. It is recognized that a fraction of those whose first listing was after 1923 represented individuals who may have been graduated before 1923 but for some reason were not listed in the directories of the American Medical Association until after that date.

In 1938, there was present in the Northeastern area a high proportion (51 percent) of young physicians as contrasted with a relatively low proportion (36 percent) in the Southern group, while the Central and Western States occupied intermediate positions. These differences are particularly outstanding when it is recalled that the physician-population ratios followed essentially this same pattern. At the two extremes are found the Northeastern States with 163 physicians per 100,000 population, approximately one-half of whom had entered practice within the past 15 years, and the Southern States with a low physician-population ratio of 94, of which number only slightly more than one-third represented physicians recently entering the profession.

The percentage of new registrants varied with the degree of urbanization: a high level (51 percent) is found in States that are 70 percent or more urban, while only 35 percent are found in those that are less than 30 percent urban. Here, again, States showing large fractions of young physicians are those in which the total numbers of physicians were greater. Similar disclosures are revealed when classification is made on the bases of hospital facilities and population change

(figure 4). In all the comparisons, groups of urban States show higher proportions of recent graduates than do those that are rural in character. Furthermore, the proportions in both urban and rural States appear to be elevated when hospital facilities are comparatively plentiful and when there has been considerable population increase over the preceding years. These findings reveal that those characteristics of States that bring about a high ratio of physicians to population are also associated with a high fraction of young physi-

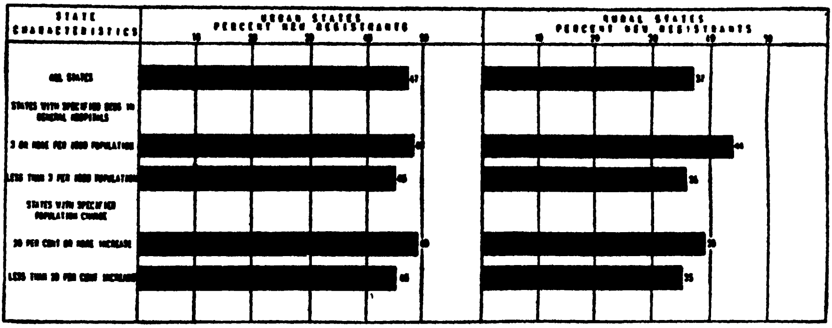

FIGURE 4.—Percent of new registrants among physicians in 1938 for urban and rural States (a) with different hospital facilities in 1930 and (b) with different population change 1920–40.

cians—a situation which is governed to a great extent by wealth, urbanization, hospital facilities, and population change found within these areas.

COMMENTS

Throughout the foregoing discussion the point at issue is this: Can the undirected forces in a free society be relied upon to effect an equable distribution of physicians? Obviously, the answer will be in the negative so long as there remain gross differences as well as deficiencies in individual and community resources. Furthermore, it is believed that any scheme designed to remedy existing inequalities in the availability of professional skill must take into account those basic factors revealed by this study—factors associated with the present maldistribution of medical resources.

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Appendix

Distribution of physicians by States in 1923 and 1938

State	Physicians[1] in 1923	Physicians per 100,000 population in 1923	Physicians[2] in 1938	Physicians per 100,000 population in 1938	Physicians[3] in 1938 who were new registrants	Physicians[4] in 1938 who had moved from other States
Total, United States	145,969	131	169,628	131	75,267	31,333
Alabama	2,313	94	2,072	74	630	393
Arizona	372	101	562	115	264	301
Arkansas	2,303	129	1,850	96	531	322
California	7,549	180	11,278	169	4,936	3,172
Colorado	1,882	194	1,923	174	824	420
Connecticut	1,727	118	2,503	148	1,257	669
Delaware	265	116	326	125	174	94
District of Columbia	1,924	424	2,141	339	1,085	891
Florida	1,348	118	2,072	115	744	1,003
Georgia	3,274	113	2,756	89	880	507
Idaho	452	104	426	84	183	165
Illinois	10,716	156	11,942	152	5,181	1,437
Indiana	4,353	143	4,081	120	1,574	660
Iowa	3,490	144	3,100	123	1,033	625
Kansas	2,492	138	2,117	117	687	473
Kentucky	3,155	127	2,762	99	910	522
Louisiana	2,058	108	2,200	95	910	346
Maine	1,067	137	987	118	318	222
Maryland	2,349	155	2,821	158	1,361	581
Massachusetts	5,977	150	7,528	174	3,720	1,103
Michigan	4,653	114	6,142	122	3,083	978
Minnesota	2,774	113	3,426	125	1,699	572
Mississippi	1,792	96	1,495	70	400	318
Missouri	5,827	167	5,348	143	1,924	649
Montana	568	104	520	94	203	175
Nebraska	1,913	145	1,705	129	554	305
Nevada	140	171	148	138	59	82
New Hampshire	615	136	616	127	241	198
New Jersey	3,362	97	5,433	131	2,963	1,182
New Mexico	399	105	419	82	158	211
New York	16,857	151	25,618	198	14,139	3,120
North Carolina	2,226	80	2,663	76	1,129	766
North Dakota	517	79	508	78	188	111
Ohio	8,086	133	9,117	133	4,076	1,261
Oklahoma	2,600	121	2,364	101	789	521

[1] Based upon State totals published in the 1923 American Medical Directory.
[2] Based upon State totals published in the 1938 American Medical Directory.
[3] Physicians listed in 1938 whose first listing during study period was in 1925 or some later directory.
[4] Physicians listed in 1938 who had made 1 or more State change during the study period.

Distribution of physicians by States in 1923 and 1938—Continued

State	Physicians in 1923	Physicians per 100,000 population in 1923	Physicians in 1938	Physicians per 100,000 population in 1938	Physicians in 1938 who were new registrants	Physicians in 1938 who had moved from other states
Oregon	1,158	138	1,386	130	575	344
Pennsylvania	11,244	125	13,205	134	6,051	1,199
Rhode Island	754	119	938	134	452	217
South Carolina	1,368	80	1,354	72	504	267
South Dakota	630	96	535	82	176	148
Tennessee	3,228	113	2,917	102	1,030	563
Texas	6,094	120	6,795	108	2,793	1,381
Utah	497	106	567	105	258	117
Vermont	556	157	501	140	189	118
Virginia	2,503	107	2,818	107	1,137	764
Washington	1,756	123	2,123	125	886	649
West Virginia	1,751	113	1,823	98	731	440
Wisconsin	2,772	101	3,436	111	1,570	644
Wyoming	263	128	266	108	108	126

RICKETTSIA-LIKE ORGANISM FROM NORMAL *DERMACENTOR ANDERSONI* STILES[1]

By EDWARD A. STEINHAUS, *Assistant Bacteriologist, United States Public Health Service*

In connection with studies on the microbial flora of ticks, observations have been made of a rickettsia-like organism which occurs in the tissues of *Dermacentor andersoni*. It is possibly the same microorganism observed by earlier workers (Wolbach (*1*), Ricketts (*3*), Parker and Spencer (*6*), Pinkerton and Hass (*7*)) incident to studies of the rickettsia of Rocky Mountain spotted fever. The present report has to do with its occurrence in the tick, its morphology, its cultivation in the fluids of the embryonic chick, and its relationship to other rickettsiae occurring spontaneously in the same tick species.

OCCURRENCE IN THE TICK

Ticks used in these studies (1940 and 1941) were from a stock laboratory strain initiated in 1934 and reared subsequently through several generations. The feeding of these ticks has never caused fever in the host animals (rabbits) and repeated tests by injecting them into guinea pigs have failed to produce any evidence of disease.

The organism has been found in every stage of the tick, including the egg, and was invariably present in large numbers in each of several hundred adults. It was usually most abundant in the epithelial cells of the intestinal diverticula, but in some specimens was found throughout the tissues. In isolated cellular elements it was seen within the cytoplasm of the cells but has not been observed with certainty in the nucleus.

[1] From the Rocky Mountain Laboratory (Hamilton, Montana) of the Division of Infectious Diseases, National Institute of Health.

Morphologic characteristics.—The organism is Gram negative. Like rickettsiae, it stains red by the Macchiavello method. With Giemsa it stains bluish-purple, slightly darker than the Rocky Mountain spotted fever rickettsia. This and the ordinary bacterial stains do not color it quite as deeply or as distinctly as they do most bacteria. The organism is not acid fast.

It is usually somewhat larger than the spotted fever rickettsia, ranging approximately from 0.3 to 0.8 by 0.5 to 4.5 microns. It frequently occurs in short chains of two or three closely joined members, and occasionally as filaments.

CULTIVATION EXPERIMENTS

Artificial media.—Repeated attempts to cultivate this organism on artificial media failed. The media used were beef infusion agar, beef infusion broth, glucose beef infusion agar, nutrient blood agar, North's gelatin chocolate agar, glucose-sucrose broth, ascitic fluid, peptone-gelatin-blood medium (Kligler and Aschner: J. Bact., **22**; 103–116 (1931)), sodium thioglycollate broth, Zinsser's tissue culture agar, Noguchi's leptospira medium (plain), Noguchi's leptospira semisolid medium with the addition of glucose, sucrose, maltose, mannose, levulose, mannitol, dextrin, xylose, inulin, salicin, dulcitol, and rhamnose in a concentration of 0.2 percent each, the same containing minced fresh rabbit kidney, and Novy and McNeal's medium containing the same sugars as the foregoing. The cultures were incubated at 17°, 24°, 32°, and 37.5° C., both aerobically and anaerobically.

Chick embryo method.—Several strains were established in chicken eggs incubated at 39° C. for 5 or 6 days, and then inoculated with triturated tick viscera in a manner similar to that used by Cox (*2*) for rickettsiae. The eggs were then incubated at 32°–34° C. until the embryos died, usually between the second and sixth days. The organism appears to grow chiefly in the egg fluids of which 0.5 cc. was used as the inoculum for serial passage. It has thus been carried through 30 passages. Five or six initial transfers were necessary to establish the organism definitely.

The organism in the egg appeared identical with that in ticks, though it was sometimes definitely longer.

Fluids of the twelfth to fifteenth passage-eggs were unsuccessfully used in further attempts to cultivate the organism on the artificial media already mentioned.

TESTS FOR POSSIBLE PATHOGENICITY

At first tick tissues and tick eggs were tested for infectiousness by intraperitoneal injection in guinea pigs. The results were negative.

Later, chick egg fluids, often in massive doses, were used in guinea pigs, rabbits, white mice, a monkey, and the following natural hosts of *Dermacentor andersoni:* bushy-tailed wood rats (*Neotoma cinerea*), Columbian ground squirrels (*Citellus columbianus*), pine squirrels (*Tamiasciurus richardsoni*), flying squirrels (*Glaucomys sabrinus*), chipmunks (*Eutamias amoenus*), and side-striped ground squirrels (*Citellus* (*Callospermophilus*) *lateralis*). In no case was there any evidence of infection.

Immunity tests.—Because this organism occurs in the same species of tick as the morphologically similar Rocky Mountain spotted fever rickettsia, most of the test guinea pigs and rabbits were later injected with Rocky Mountain spotted fever infective blood. None were immune. Others were similarly shown nonimmune to American "Q" fever also transmitted by *Dermacentor andersoni.*

This organism is tentatively assigned to the genus *Rickettsia* and the specific name *dermacentrophila* is proposed for it.

SUMMARY

A rickettsia-like organism occurring spontaneously in the tissues of *Dermacentor andersoni* ticks is described. It cannot be cultivated on various artificial media, but is readily maintained by serial passage in incubating fertile chick eggs. The egg fluids, which constantly contain large numbers of organisms, were used as the transfer medium. It is nonpathogenic for laboratory animals and various rodent hosts of *D. andersoni*, and inoculated animals are not subsequently immune to Rocky Mountain spotted fever or American "Q" fever.

The name *Rickettsia dermacentrophila* n. sp. is proposed for this organism.

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STUDIES ON THE DURATION OF DISABLING SICKNESS

II. Duration of Disability From Sickness and Nonindustrial Injuries Among Male Workers, Disabilities Lasting One Calendar Day or Longer[1]

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The first paper (*1*) of the series on the duration of disabling sickness and nonindustrial injuries was based on ended cases lasting 8 calendar days or longer that had been reported periodically by 25 industrial sick benefit organizations for the 3-year period, 1935–37. These organizations subscribed to waiting and maximum benefit periods of varying length. The paper presented principally two basic tables showing industrial morbidity by sex and broad cause group. One table gave the average annual number of cases per 1,000 persons causing disability for a specified number of days, *t*, or more, and the other, the average annual number of days of disability per person resulting from all disabilities contributing *t* days or less, the *t* in both instances varying from 8 through 372 days.

It had been planned originally to base the present report on the experiences of 8 industrial sick benefit organizations all subscribing to a maximum benefit period of 52 weeks. The pertinent analyses have been made in this connection, and because of the relatively small number of female workers included in the records, attention was restricted to the disability reports on males. Furthermore, the analyses were made specific for waiting period. Six of the organizations had a waiting period of 7 days, 1 organization connected with a public utility company had no waiting period, and 1 whose membership was composed of workers in an oil refining company had no waiting period for salaried workers but a waiting period of several days for the other workers. The results of the analyses of the combined experiences of the 6 organizations with a 7-day waiting period showed the two principal tables presenting frequency and disability rates, respectively, to agree essentially with the corresponding tables published in the earlier paper; the frequency rates as well as the disability rates for each of the other 2 organizations, on the other hand, differed from each other and from those already published. These differences are primarily attributable to differences in the length of the waiting period, since it has been found in earlier experiences that organizations with relatively short waiting periods, or no waiting periods at all, are likely to have a more complete record of the 8-day or longer cases than those organizations with longer waiting periods.

The present paper and the succeeding one[2] will, therefore, be

[1] From the Division of Industrial Hygiene, National Institute of Health. For earlier papers in the series see references *1* and *2*.

[2] This paper has already appeared (*2*).

devoted to the workers of the public utility and the oil refining company, respectively. With regard to each company an additional 2 years of data covering 1937–39 have become available. Moreover, in the instance of the oil refining company, the availability of the requisite data makes possible a study of the relation of age to morbidity.

Thus an analysis of the material from the two companies will supplement considerably the picture presented in the first paper, particularly in respect of durations of less than 8 days, and of age, respectively.

The public utility company, the morbidity experience of whose male workers forms the subject of the present paper,[3] inaugurated a liberal disability benefit plan in 1913. This plan provided for payment of wages in full or in part during disability and beginning with the first day of absence. During the second 6 months of membership, a worker is allowed accumulated sick leave of 1 day per month at full pay. After the first year of membership, full pay for continuous disability is allowed for 15 weeks; beyond this time three-fourths to one-fourth of the worker's wages are paid, the period of payment depending upon the number of years of employment with the company. However, for present purposes all cases of continuous disability extending over 372 calendar days were arbitrarily closed at the end of the three hundred and seventy-second day. In all instances "days' refer to calendar days, and absences of less than 1 full calendar day are omitted.

It is well known that age is an important factor in the frequency and duration of disabilities. The available information indicates that as of 1940 approximately 25 percent of the workers were 50 years of age and over, a percentage that compares favorably with a number of other industrial populations studied by the Division.

It is purposed to present two fundamental tables of the type referred to above, the two indexes carried by the tables being specific for three broad cause groups, and based on all ended cases that lasted 1 calendar day or longer during the 7 years, 1933–39.

ANALYSIS OF THE DATA

The 7-year period represented by 18,487 male-years of membership in the disability plan yielded 16,701 absences of 1 calendar day or longer, and 135,873 days of disability. When converted into average annual rates these data become 903.4 absences per 1,000 males, and 7.350 days of disability per male.

Average annual number of absences per 1,000 males on account of sickness and nonindustrial injuries disabling for a specified number of

[3] This is the seventh paper based primarily on morbidity reports from this company. The sixth paper (5) contains a list of the earlier papers.

days t or more.—The pertinent data are shown in table 1 and graphically for the first 28 days in figure 1. The table presents the frequency of ended absences lasting a certain number of days, *t*, or longer for all cause groups and each of three broad cause groups. Thus the frequency of ended cases accounted for by the respiratory diseases and lasting 2 days or longer is 432.7 per 1,000 males, while the corresponding frequency for the nonrespiratory diseases is 219.0. The magnitude of the rapidity of decrease of the frequencies with increasing values of *t* is determined by whether or not there is a preponderance of long or short absences, the long absences inhibiting the rate of decrease while the short ones accelerate it.

It will be observed that (1) the frequency of 8-day or longer absences is higher for each cause group when compared with the corresponding frequencies published in the previous paper of the series,

TABLE 1.—*Annual number of absences per 1,000 males, on account of sickness and nonindustrial injuries disabling for a specified number of days* t *or more, by broad cause group, experience of male employees of a public utility, absences lasting 1 calendar day or longer and ending during 1933–39, inclusive*

t days	Annual number of absences per 1,000 males lasting *t* days or more				Number of absences lasting *t* days or more			
	All sickness and nonindustrial injuries	Nonindustrial injuries	Respiratory diseases	Nonrespiratory diseases	All sickness and nonindustrial injuries	Nonindustrial injuries	Respiratory diseases	Nonrespiratory diseases
1	903.4	47.7	547.0	308.7	16,701	882	10,112	5,707
2	691.3	39.6	432.7	219.0	12,781	733	7,999	4,049
3	539.9	33.8	338.8	167.3	9,981	625	6,264	3,092
4	405.5	28.4	249.5	127.6	7,496	525	4,613	2,358
5	319.4	24.0	190.8	104.6	5,905	444	3,528	1,933
6	254.0	21.3	144.5	88.2	4,695	393	2,671	1,631
7	198.1	18.6	104.4	75.1	3,662	343	1,981	1,388
8	144.4	14.8	67.9	61.7	2,669	273	1,256	1,140
9	127.6	13.5	56.3	57.8	2,359	250	1,041	1,068
10	116.1	12.6	48.7	54.8	2,146	233	900	1,013
11	104.9	11.5	41.5	51.9	1,939	212	767	960
12	95.4	10.8	35.5	49.1	1,763	200	656	907
13	87.5	10.1	30.3	47.1	1,617	186	561	870
14	80.9	9.4	26.6	44.9	1,496	174	492	830
15	70.3	8.0	20.7	41.6	1,299	148	383	768
16	67.7	7.7	19.4	40.6	1,252	143	358	751
17	65.9	7.5	18.6	39.8	1,219	138	344	737
18	64.5	7.3	17.9	39.3	1,192	135	331	726
19	62.2	7.0	17.0	38.2	1,151	130	315	706
20	60.6	6.9	16.2	37.5	1,120	128	299	693
21	58.5	6.8	15.3	36.4	1,081	125	282	674
22	54.9	6.2	13.8	34.9	1,016	116	255	645
23	53.4	6.2	13.0	34.2	987	114	241	632
24	52.0	6.0	12.7	33.3	962	111	235	616
25	50.4	5.7	12.2	32.5	932	106	226	600
26	49.7	5.5	12.0	32.2	919	101	222	596
27	48.8	5.4	11.6	31.8	902	99	215	588
28	47.1	5.4	11.0	30.7	870	99	203	568
35	38.6	4.6	8.4	25.6	714	86	155	473
42	32.3	4.0	7.0	21.3	597	73	130	394
49	27.0	3.2	5.7	18.1	500	59	105	336
56	22.2	2.9	4.4	14.9	411	53	81	277
63	18.1	2.2	3.6	12.3	334	40	67	227
70	15.5	1.7	3.3	10.5	286	32	61	193
77	13.1	1.5	2.5	9.1	242	27	47	168
84	12.1	1.2	2.3	8.6	224	23	42	159
91	10.6	1.1	1.8	7.7	197	20	33	144
98	9.3	1.0	1.7	6.6	172	18	31	123
182	4.0	.2	.8	3.0	74	4	14	56
273	2.8	.1	.6	2.1	51	1	12	38
365	1.9	.1	.5	1.3	35	1	10	24
372	1.9	.1	.5	1.3	34	1	9	24

and (2) for each value of t the frequency for the respiratory diseases is consistently higher than that for the nonrespiratory diseases up through the eighth day; in the neighborhood of the eighth day, however, the two frequencies are equal to each other, and for higher

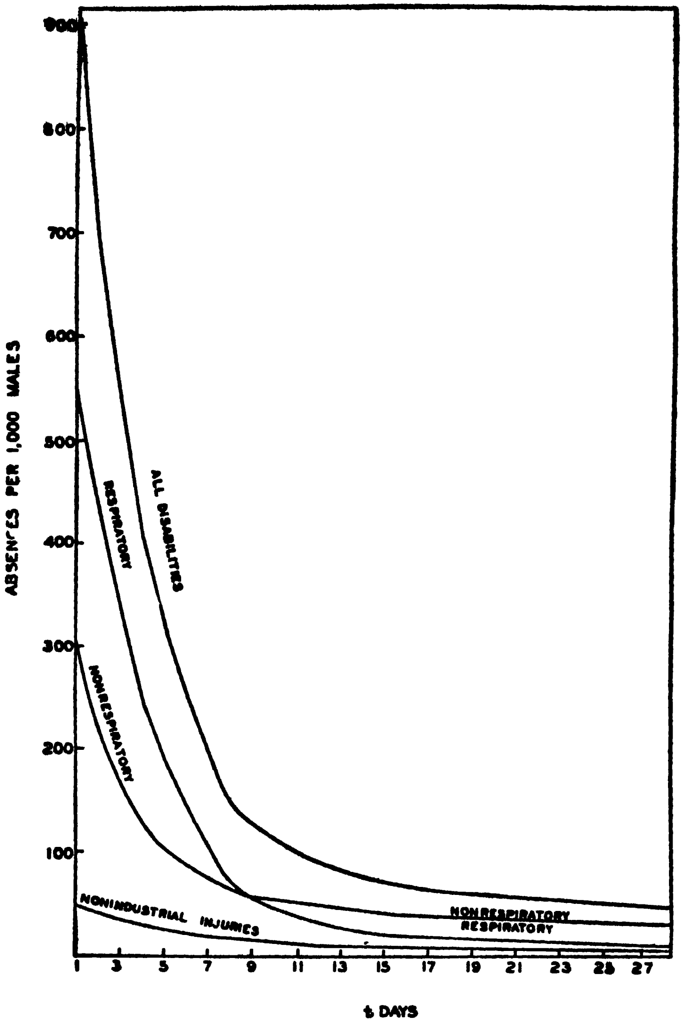

FIGURE 1.—Annual number of absences per 1,000 males on account of sickness and nonindustrial injuries disabling for a specified number of days, t or more, by broad cause group, experience of male employees of a public utility, absences lasting 1 calendar day or longer and ending during 1933–39, inclusive.

values of t the nonrespiratory frequencies are consistently higher, the behavior of the two frequencies beyond the eighth day being similar to that shown in the earlier paper on 8-day or longer disabilities. These observations serve to emphasize that a benefit plan with a relatively short waiting period or no waiting period at all is

likely to yield a more complete record of 8-day or longer absences, and that a relatively large number of short absences is characteristic of the respiratory diseases.

Average annual number of days of disability per male resulting from all disabilities contributing t days or less.—Table 2 shows by broad cause group the disability rates and the number of days disabled for values of *t* from 1 through 372 days. Thus for all sickness and nonindustrial injuries the number of days per male per year varies from 0.9 to 7.350 as *t* assumes values from 1 through 372 days. It will be observed that the number of days (16,701) for *t* equals 1 is the same as the number of absences for *t* equals 1 shown in table 1. Furthermore the total number of days of disability (135,873) is given by *t* equals 372.

TABLE 2.—*Annual number of days of disability per male resulting from all disabilities contributing* t *days or less, by broad cause group, experience of male employees of a public utility, absences lasting 1 calendar day or longer due to sickness and nonindustrial injuries and ending during 1933–39, inclusive*

t days	Annual number of days of disability per male resulting from all disabilities contributing *t* days or less				Number of days of disability resulting from all disabilities contributing *t* days or less			
	All sickness and nonindustrial injuries	Nonindustrial injuries	Respiratory diseases	Nonrespiratory diseases	All sickness and nonindustrial injuries	Nonindustrial injuries	Respiratory diseases	Nonrespiratory diseases
1	0.903	0.047	0.547	0.309	16,701	882	10,112	5,707
2	1.595	.087	.980	.528	29,482	1,615	18,111	9,756
3	2.135	.121	1.319	.695	39,463	2,240	24,375	12,848
4	2.540	.149	1.568	.823	46,959	2,765	28,988	15,206
5	2.860	.174	1.759	.927	52,864	3,209	32,516	17,139
6	3.118	.195	1.903	1.015	57,559	3,602	35,187	18,770
7	3.312	.213	2.008	1.091	61,221	3,945	37,118	20,158
8	3.456	.228	2.076	1.152	63,890	4,218	38,374	21,298
9	3.584	.242	2.132	1.210	66,249	4,468	39,415	22,366
10	3.700	.254	2.181	1.265	68,395	4,701	40,315	23,379
11	3.805	.266	2.222	1.317	70,334	4,913	41,082	24,339
12	3.900	.277	2.258	1.365	72,097	5,113	41,738	25,246
13	3.987	.287	2.288	1.412	73,714	5,299	42,299	26,116
14	4.068	.296	2.315	1.457	75,210	5,473	42,791	26,946
15	4.139	.304	2.336	1.499	76,509	5,621	43,174	27,714
16	4.206	.312	2.354	1.540	77,761	5,764	43,532	28,465
17	4.272	.319	2.373	1.580	78,980	5,902	43,876	29,202
18	4.337	.327	2.391	1.619	80,172	6,037	44,207	29,928
19	4.399	.334	2.408	1.657	81,323	6,167	44,522	30,634
20	4.460	.341	2.424	1.695	82,443	6,295	44,821	31,327
21	4.518	.347	2.440	1.731	83,524	6,420	45,103	32,001
22	4.573	.354	2.453	1.766	84,540	6,536	45,358	32,646
23	4.626	.360	2.466	1.800	85,527	6,650	45,599	33,278
24	4.678	.366	2.479	1.833	86,489	6,761	45,834	33,894
25	4.729	.371	2.492	1.866	87,421	6,867	46,060	34,494
26	4.778	.377	2.503	1.898	88,340	6,968	46,282	35,090
27	4,827	.382	2.515	1.930	89,242	7,067	46,497	35,678
28	4.874	.388	2.526	1.960	90,112	7,166	46,700	36,246
35	5.167	.422	2.592	2.153	95,530	7,805	47,911	39,813
42	5.413	.452	2.645	2.316	100,066	8,357	48,899	42,810
49	5.616	.476	2.688	2.452	103,826	8,808	49,687	45,336
56	5.785	.497	2.721	2.567	106,946	9,158	50,337	47,456
63	5.924	.514	2.749	2.661	109,511	9,492	50,821	49,198
70	6.039	.527	2.773	2.739	111,636	9,734	51,262	50,640
77	6.137	.538	2.793	2.806	113,449	9,941	51,631	51,877
84	6.224	.547	2.809	2.868	115,055	10,114	51,927	53,014
91	6.302	555	2.822	2.925	116,501	10,256	52,179	54,066
98	6.370	.562	2.834	2.974	117,760	10,382	52,397	54,981
182	6.839	.597	2.916	3.326	126,492	11,081	53,915	61,496
273	7.128	.606	2.983	3.539	131,772	11,195	55,146	65,431
365	7.336	.610	3.037	3.689	135,630	11,287	56,137	68,206
372	7.350	.611	3.040	3.699	135,873	11,294	56,206	68,373

The rates are presented graphically in figure 2. Most striking is the crossing of the curves for the respiratory and nonrespiratory groups of diseases at approximately t equals 77. This phenomenon

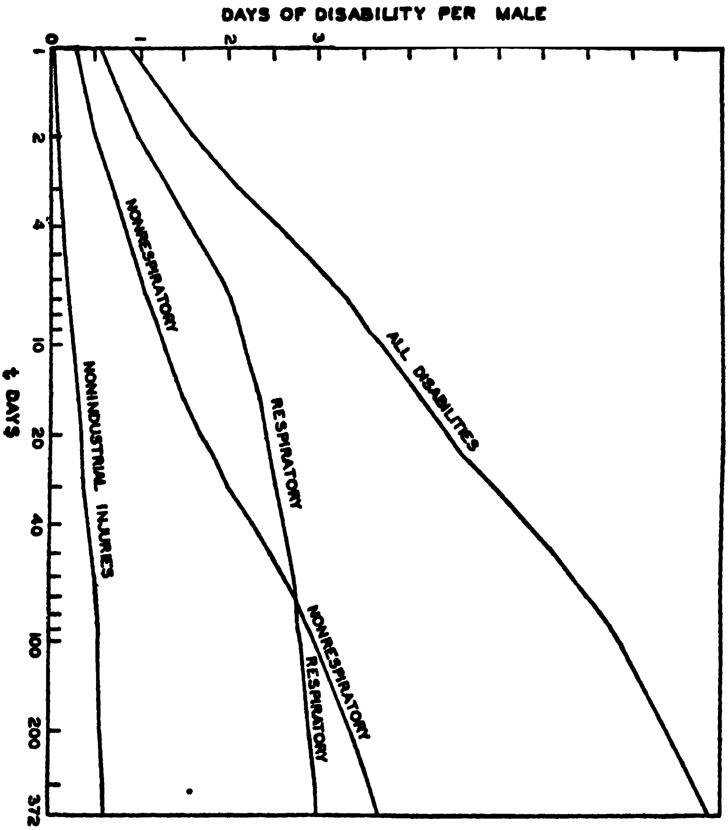

FIGURE 2.—Annual number of days of disability per male resulting from all disabilities contributing t days or less, by broad cause group, experience of male employees of a public utility, absences lasting 1 calendar day or longer due to sickness and nonindustrial injuries and ending during 1933–39, inclusive. (Logarithmic horizontal scale.)

again reflects the relatively large number of short absences because of the respiratory diseases.

SUMMARY

This paper, the second of a series on the duration of disabling sickness and nonindustrial injuries, based on absences lasting 1 calendar day or longer, reported periodically by a public utility company over a period of 7 years, presents principally two basic tables showing for males, and by broad cause group, the frequency and disability rates corresponding to different durations of disability.

The previous paper of the series dealt only with disabilities lasting 8 days or longer. The present paper shows the effect of introducing disabilities of less than 8 days' duration, particularly the effect of the respiratory group of diseases with its preponderance of short absences.

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(1) Gafafer, W. M., and Frasier, E. S.: Studies on the duration of disabling sickness. I. Duration of disability from sickness and nonindustrial injuries among the male and female memberships of 25 industrial sick benefit organizations, 1935–37, inclusive. Pub. Health Rep., 55: 1892–1903 (October 18, 1940).
(2) Gafafer, W. M., Sitgreaves, R., and Frasier, E. S.: Studies on the duration of disabling sickness. III. Duration of disability from sickness and nonindustrial injuries among the male employees of an oil refining company with particular reference to the older worker, 1933–39, inclusive. Pub. Health Rep., 57: 112–125 (January 23, 1942).
(3) Gafafer, W. M.: Frequency and duration of disabilities causing absence from work among the employees of a public utility, 1938–41. Pub. Health Rep. Pub. Health Rep., 57: 625–627 (April 24, 1942).

DEATHS DURING WEEK ENDED AUGUST 29, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug. 29, 1942	Corresponding week 1941
Data from 87 large cities of the United States:		
Total deaths	7,271	7,067
Average for 3 prior years	7,045	
Total deaths, first 34 weeks of year	282,997	286,683
Deaths per 1,000 population, first 34 weeks of year, annual rate	11.7	11.9
Deaths under 1 year of age	602	532
Average for 3 prior years	500	
Deaths under 1 year of age, first 34 weeks of year	18,985	17,581
Data from industrial insurance companies:		
Policies in force	64,982,742	64,441,524
Number of death claims	10,061	9,397
Death claims per 1,000 policies in force, annual rate	8.1	7.6
Death claims per 1,000 policies, first 34 weeks of year, annual rate	9.4	9.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED SEPTEMBER 5, 1942

Summary

The incidence of the important common communicable diseases continued favorable during the week. The number of cases of poliomyelitis declined from 202 for the preceding week to 195, and the number of cases of meningococcus meningitis from 58 to 41.

The East North Central (75 cases) and the Middle Atlantic States (43) reported the highest incidence of poliomyelitis. Illinois reported the largest number of cases (36) for the week. A total of 135 cases has been reported in that State since August 1. Other States reporting more than 10 cases during the current week were: New Jersey 21, New York 19, Ohio 17, Michigan 12, and California 12.

Of 41 cases of meningococcus meningitis, 12 cases occurred in the Middle Atlantic States. New York (8 cases) was the only State which reported more than 3 cases.

Of the 9 communicable diseases listed in the following table, and for which corresponding data are available for prior years, the cumulative totals to date are above the 5-year (1937–41) medians for only measles and meningococcus meningitis. The current incidence of measles is below the median expectancy.

Other reports include 2 cases of anthrax (1 each in Georgia and Louisiana), 21 cases of infectious encephalitis (7 in Washington State and 4 in California), 29 cases of amebic dysentery (11 in Texas), 217 cases of bacillary dysentery (136 in Texas), 152 cases of unspecified dysentery (118 in Virginia), 5 cases of Rocky Mountain Spotted Fever, 7 cases of smallpox, and 126 cases of endemic typhus fever (48 in Georgia, 34 in Texas, 16 in Florida, and 14 in Alabama—89 percent of the total in these 4 States).

The death rate for the current week in 88 large cities in the United States is 10.6 per 1,000 population, as compared with 10.3 last week and a 3-year (1939–41) average of 10.2.

Telegraphic morbidity reports from State health officers for the week ended Sept. 5, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41
	Sept. 5, 1942	Sept. 6, 1941		Sept. 5, 1942	Sept. 6, 1941		Sept. 5, 1942	Sept. 6, 1941		Sept. 5, 1942	Sept. 6, 1941	
NEW ENG.												
Maine	0	0	1	------	------	------	16	12	12	1	0	0
New Hampshire	0	0	0	------	------	------	1	1	0	0	0	0
Vermont	0	1	0	------	------	------	29	25	0	0	1	0
Massachusetts	1	0	2	------	------	------	46	31	30	2	1	0
Rhode Island	0	0	0	------	------	------	5	1	1	0	1	0
Connecticut	0	0	0	3	------	------	15	10	5	0	0	0
MID. ATL.												
New York	10	4	8	[1] 4	[1] 1	[1] 1	42	71	75	8	7	2
New Jersey	2	2	2	3	2	2	12	83	20	1	0	0
Pennsylvania	4	10	11	1	------	------	15	76	76	3	4	4
E. NO. CEN.												
Ohio	10	10	10	5	7	4	31	18	18	1	2	1
Indiana	0	4	4	8	19	8	0	2	5	1	0	1
Illinois	14	16	13	2	------	6	10	84	23	3	2	0
Michigan [2]	6	3	6	2	------	3	16	11	27	0	0	0
Wisconsin	0	0	1	11	13	13	36	61	47	1	1	1
W. NO. CEN.												
Minnesota	1	6	7	1	------	1	5	4	9	1	0	0
Iowa	1	2	2	------	------	------	10	3	4	0	1	1
Missouri	8	4	7	------	11	11	4	6	2	3	1	0
North Dakota	1	1	2	5	7	2	3	6	2	0	0	0
South Dakota	3	9	1	------	------	------	3	2	0	0	0	0
Nebraska	1	0	1	------	------	------	3	1	2	0	0	0
Kansas	7	0	2	------	2	------	8	1	2	1	1	1
SO. ATL.												
Delaware	0	0	0	------	------	------	0	1	0	0	0	0
Maryland [2]	3	0	1	4	------	2	7	20	5	2	2	0
Dist. of Col.	2	1	1	------	------	------	1	6	2	0	0	0
Virginia	5	12	16	44	119	12	1	34	10	1	4	1
West Virginia	1	5	7	1	5	15	0	29	3	3	0	1
North Carolina	45	34	44	------	------	------	5	24	20	2	1	2
South Carolina	12	41	7	58	93	103	0	27	10	0	0	0
Georgia	13	23	23	18	19	14	1	39	2	0	1	0
Florida	1	8	6	3	2	1	11	4	4	0	0	0
E. SO. CEN.												
Kentucky	4	11	11	3	------	1	2	6	6	1	3	1
Tennessee	8	25	6	5	2	7	3	25	25	0	4	0
Alabama	20	33	13	26	2	5	16	2	2	0	1	1
Mississippi [2]	7	10	17	------	------	------	------	------	------	0	1	1
W. SO. CEN.												
Arkansas	11	15	14	2	4	4	1	21	8	0	0	0
Louisiana	2	4	7	5	1	3	1	3	1	0	0	0
Oklahoma	3	8	7	1	20	15	1	6	3	0	0	0
Texas	20	38	31	103	530	76	21	48	15	2	1	1
MOUNTAIN												
Montana	2	8	1	------	------	------	10	2	7	0	0	0
Idaho	0	0	0	------	------	------	8	0	0	0	0	0
Wyoming	0	0	0	13	8	------	8	3	3	0	0	0
Colorado	3	8	13	3	36	1	4	13	7	0	1	0
New Mexico	0	0	2	------	------	------	0	5	5	1	0	0
Arizona	9	1	0	28	25	10	4	23	3	0	1	0
Utah [2]	0	0	0	3	3	2	19	9	8	0	0	0
Nevada	0	0	------	------	------	------	1	1	------	0	0	------
PACIFIC												
Washington	5	0	0	------	------	------	44	3	8	0	1	1
Oregon	1	1	2	3	3	3	49	7	5	1	1	0
California	7	7	14	20	18	11	62	62	53	2	0	0
Total	248	360	360	388	952	343	585	885	633	41	44	26
35 weeks	7,871	8,133	12,687	81,658	491,321	160,817	407,858	825,347	349,371	2,495	1,483	1,483

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended Sept. 5, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Sept. 5, 1942	Sept. 6, 1941		Sept. 5, 1942	Sept. 6, 1941		Sept. 5, 1942	Sept. 6, 1941		Sept. 5, 1942	Sept. 6, 1941	
NEW ENG.												
Maine	0	2	0	3	7	2	0	0	0	2	1	1
New Hampshire	0	1	0	2	2	1	0	0	0	0	0	0
Vermont	0	0	0	1	2	1	0	0	0	0	2	0
Massachusetts	1	18	3	62	31	22	0	0	0	7	2	2
Rhode Island	1	0	0	6	2	1	0	0	0	1	0	0
Connecticut	6	6	2	15	8	4	0	0	0	2	0	3
MID. ATL.												
New York	19	71	52	52	66	50	0	0	0	9	17	17
New Jersey	21	32	10	24	28	16	0	0	0	2	3	5
Pennsylvania	3	66	19	43	35	57	0	0	0	19	22	24
E. NO. CEN.												
Ohio	17	33	31	53	48	46	0	0	0	13	22	26
Indiana	7	4	4	7	9	28	1	0	0	9	7	9
Illinois	36	21	21	30	40	57	0	1	1	10	10	20
Michigan [2]	12	7	34	22	18	62	0	0	0	10	6	9
Wisconsin	3	6	7	53	37	42	1	1	0	1	2	2
W. NO. CEN.												
Minnesota	3	23	18	10	18	18	0	0	2	0	0	0
Iowa	1	1	2	18	16	16	0	0	0	0	3	3
Missouri	4	1	1	11	19	16	1	0	0	9	11	11
North Dakota	1	4	1	2	2	4	0	0	0	0	2	1
South Dakota	1	1	1	9	4	6	0	0	0	1	0	0
Nebraska	------	0	2	5	2	3	0	0	0	0	0	0
Kansas	5	6	6	20	30	27	0	0	0	1	1	5
SO. ATL.												
Delaware	0	0	0	2	2	1	0	0	0	2	2	2
Maryland [2]	2	16	1	8	11	11	0	0	0	1	5	5
Dist. of Col.	0	7	1	5	3	2	0	0	0	0	1	2
Virginia	1	15	3	5	8	8	0	0	0	6	16	13
West Virginia	6	2	2	21	16	16	0	0	0	10	8	12
North Carolina	0	12	8	0	26	26	0	0	0	9	3	16
South Carolina	0	10	1	4	11	4	1	0	0	4	17	17
Georgia	1	49	2	12	16	15	0	0	0	6	15	18
Florida	2	4	2	5	6	2	0	0	0	4	1	2
E. SO. CEN.												
Kentucky	3	18	8	30	23	29	0	0	0	15	32	32
Tennessee	4	38	3	19	25	10	0	0	0	18	30	13
Alabama	3	66	2	26	16	16	0	0	0	8	11	12
Mississippi [2]	3	10	2	19	7	8	0	0	0	5	10	10
W. SO. CEN.												
Arkansas	5	1	2	1	4	4	1	0	0	5	12	19
Louisiana	0	3	2	5	4	4	0	0	0	7	15	19
Oklahoma	1	1	2	8	11	9	0	0	0	6	12	16
Texas	2	4	4	6	20	24	0	0	0	13	35	51
MOUNTAIN												
Montana	2	1	2	8	1	9	0	0	0	1	0	1
Idaho	0	0	1	2	2	4	2	0	0	1	1	2
Wyoming	0	2	0	1	1	3	0	0	0	0	1	1
Colorado	0	3	3	4	15	11	0	0	0	0	3	4
New Mexico	1	1	1	3	1	1	0	0	0	5	2	7
Arizona	2	0	0	0	2	1	0	0	0	4	3	8
Utah [2]	2	4	1	2	0	5	0	0	0	0	0	1
Nevada	0	0	------	0	0	------	0	0	0	0	0	------
PACIFIC												
Washington	2	2	1	8	11	8	0	0	0	2	2	2
Oregon	0	6	2	0	7	6	0	0	1	1	3	3
California	12	7	21	25	26	53	0	0	0	2	4	12
Total	195	585	585	683	699	799	7	2	16	231	355	543
35 weeks	1,902	4,606	4,016	90,442	91,041	117,978	621	1,157	8,080	4,498	5,460	8,226

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended Sept. 5, 1942—Continued

Division and State	Whooping cough, Week ended— Sept. 5, 1942	Whooping cough, Week ended— Sept. 6, 1941	Week ended Sept. 5, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	36	13	0	0	0	0	0	0	0	0	0
New Hampshire	1	1	0	0	0	0	0	0	0	0	0
Vermont	49	6	0	0	0	0	0	0	0	0	0
Massachusetts	134	81	0	0	2	0	0	0	0	0	0
Rhode Island	10	25	0	0	0	0	0	0	0	0	0
Connecticut	59	26	0	0	5	0	1	0	0	0	0
MID. ATL.											
New York	342	270	0	0	13	0	1	0	0	0	2
New Jersey	144	116	0	0	0	0	0	0	0	0	0
Pennsylvania	180	185	0	0	1	0	0	0	0	0	0
E. NO. CEN.											
Ohio	236	322	0	1	2	0	0	0	0	0	0
Indiana	28	26	0	0	0	0	0	0	0	0	0
Illinois	270	231	0	3	20	0	1	0	0	0	0
Michigan [2]	279	190	0	1	3	0	0	0	0	0	0
Wisconsin	250	232	0	1	0	0	0	0	0	1	0
W. NO. CEN.											
Minnesota	69	75	0	0	0	0	0	0	0	0	0
Iowa	11	26	0	0	0	0	0	0	0	0	0
Missouri	7	64	0	0	0	0	0	0	0	0	0
North Dakota	11	22	0	0	0	0	2	0	0	0	0
South Dakota	0	9	0	0	0	0	2	0	0	0	0
Nebraska	10	2	0	0	0	0	0	0	0	0	0
Kansas	32	81	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	3	0	0	0	0	0	0	0	0	0	0
Maryland [2]	71	47	0	0	0	8	0	0	2	0	1
Dist. of Col.	10	19	0	0	0	0	0	0	0	0	0
Virginia	32	71	0	0	0	118	0	0	1	0	0
West Virginia	17	11	0	0	0	0	0	0	0	0	0
North Carolina	49	109	0	0	0	0	0	0	0	0	1
South Carolina	17	84	0	0	0	0	0	0	0	0	6
Georgia	36	20	1	1	4	0	0	0	0	1	48
Flordia	11	9	0	0	0	0	0	0	0	0	16
E. SO. CEN.											
Kentucky	52	74	0	0	0	0	1	0	0	0	0
Tennessee	27	59	0	1	0	1	0	0	0	1	1
Alabama	16	14	0	0	0	0	0	0	0	0	14
Mississippi [2]	------	------	0	0	0	0	0	0	0	0	1
W. SO. CEN.											
Arkansas	5	13	0	6	5	0	1	0	1	0	0
Louisiana	0	0	1	0	1	0	0	0	0	0	2
Oklahoma	4	8	0	0	0	9	0	0	0	0	0
Texas	132	127	0	11	136	0	0	0	0	2	34
MOUNTAIN											
Montana	17	6	0	0	0	0	1	0	0	0	0
Idaho	7	0	0	0	0	0	0	0	0	0	0
Wyoming	5	19	0	0	0	0	0	0	1	2	0
Colorado	20	85	0	0	8	0	0	0	0	0	0
New Mexico	6	1	0	3	4	0	0	0	0	0	0
Arizona	6	7	0	0	0	25	0	0	0	0	0
Utah [2]	8	25	0	0	0	0	0	0	0	1	0
Nevada	0	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	36	48	0	0	0	0	7	0	0	0	0
Oregon	20	20	0	0	0	0	0	0	0	0	0
California	129	191	0	1	13	0	4	0	0	0	0
Total	2,894	3,070	2	29	217	161	21	0	5	8	126
35 weeks	128,043	152,486	------	------	------	------	------	------	------	------	------

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended August 22, 1942

This table lists the reports from 88 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Baltimore, Md	2	0	1	1	3	2	6	0	4	0	0	44
Barre, Vt	0	0	------	0	1	0	0	0	0	0	0	6
Billings, Mont	0	0	------	0	1	0	2	0	0	0	0	4
Birmingham, Ala	0	0	------	0	0	0	3	0	1	0	0	1
Boise, Idaho	0	0	------	0	0	0	0	0	0	0	0	0
Boston, Mass	0	0	------	0	8	1	10	0	24	0	0	32
Bridgeport, Conn	0	0	------	0	0	0	1	0	0	0	0	0
Brunswick, Ga	0	0	------	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	------	0	0	0	3	0	6	0	0	25
Camden, N. J	0	0	------	0	1	0	1	0	4	0	0	2
Charleston, S. C	0	0	------	0	0	1	2	0	0	0	0	0
Charleston, W. Va	0	0	------	0	0	0	0	0	0	0	0	0
Chicago, Ill	10	0	1	0	7	0	15	11	9	0	2	202
Cincinnati, Ohio	0	0	1	0	1	0	1	1	8	0	0	12
Cleveland, Ohio	0	0	1	0	4	0	7	4	12	0	1	43
Columbus, Ohio	2	0	1	1	0	0	1	0	7	0	0	22
Concord, N. H	0	0	------	0	1	0	0	0	0	0	0	0
Cumberland, Md	0	0	0	0	0	0	0	0	0	0	1	0
Dallas, Tex	1	0	------	0	3	0	2	0	1	0	0	13
Denver, Colo	1	0	3	0	5	0	3	0	1	0	0	17
Detroit, Mich	3	0	------	0	8	1	3	8	13	0	1	131
Duluth, Minn	0	0	------	0	1	0	2	0	2	0	0	12
Fall River, Mass	0	0	------	0	2	0	1	0	2	0	0	1
Fargo, N. Dak	0	0	------	0	0	0	1	0	0	0	0	0
Flint, Mich	2	0	1	0	0	0	1	0	0	1	1	1
Fort Wayne, Ind	0	0	------	0	0	0	2	0	0	0	0	2
Frederick, Md	0	0	------	0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	------	0	0	0	2	0	0	0	0	0
Grand Rapids, Mich	0	0	------	0	1	0	0	0	1	0	0	5
Great Falls, Mont	0	0	1	0	2	0	0	0	0	0	0	8
Hartford, Conn	0	0	------	0	1	0	1	1	0	0	0	12
Helena, Mont	0	0	------	0	0	0	0	0	0	0	0	0
Houston, Tex	1	0	------	0	1	0	9	0	3	0	3	7
Indianapolis, Ind	2	0	------	0	1	0	3	1	2	0	0	11
Kansas City, Mo	0	0	------	0	3	0	0	0	6	0	0	4
Kenosha, Wis	0	0	------	0	1	0	0	0	4	0	0	11
Little Rock, Ark	0	0	------	0	0	0	3	0	0	0	0	0
Los Angeles, Calif	2	0	6	0	7	0	1	1	6	0	0	11
Lynchburg, Va	0	0	------	0	0	0	0	0	0	0	0	1
Memphis, Tenn	0	0	------	1	0	0	1	0	0	0	0	6
Milwaukee, Wis	0	0	1	1	17	0	1	0	6	0	0	51
Minneapolis, Minn	0	0	------	0	0	0	0	2	6	0	0	5
Missoula, Mont	0	0	------	0	0	0	0	0	0	0	0	2
Mobile, Ala	0	0	------	0	0	0	2	0	0	0	0	0
Nashville, Tenn	0	0	------	0	2	0	2	0	0	0	1	4
Newark, N. J	0	0	------	0	11	1	3	6	4	0	0	37
New Haven, Conn	0	0	------	0	0	0	0	0	0	0	3	9
New Orleans, La	1	0	------	0	3	1	10	0	0	0	0	3
New York, N. Y	4	6	7	0	18	4	36	5	12	0	6	167
Omaha, Nebr	0	0	------	0	0	0	0	0	1	0	1	1
Philadelphia, Pa	3	0	------	0	13	2	11	0	6	0	2	107
Pittsburgh, Pa	0	0	------	0	2	0	8	0	1	0	1	5
Portland, Maine	0	0	------	0	3	0	0	0	0	0	0	5
Providence, R. I	0	0	------	0	4	0	3	0	1	0	0	12

City reports for week ended August 22, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Pueblo, Colo	0	0		0	0	0	0	0	0	0	0	0
Racine, Wis	0	0		0	3	0	0	0	1	0	0	5
Raleigh, N. C	0	0		0	0	0	0	0	0	0	0	0
Reading, Pa	0	0		0	0	0	1	0	0	0	0	3
Richmond, Va	0	0		1	1	0	0	0	1	0	0	2
Roanoke, Va	0	0		0	0	0	0	0	0	0	0	0
Rochester, N. Y	0	0		1	1	0	4	1	1	0	0	7
Sacramento, Calif	0	0		0	1	0	1	0	1	0	0	4
Saint Joseph, Mo	0	0		0	1	0	4	0	0	0	0	0
Saint Louis, Mo	2	1		0	1	0	7	4	4	0	1	5
Saint Paul, Minn	0	0		0	1	0	2	1	3	0	0	28
Salt Lake City, Utah	0	0		0	13	0	0	0	0	0	0	7
San Antonio, Tex	1	0		0	3	0	3	0	1	0	0	4
San Francisco, Calif	0	0		0	1	1	7	0	1	0	0	7
Savannah, Ga	0	0		0	0	0	0	0	0	0	0	6
Seattle, Wash	2	0		1	7	0	2	0	0	0	0	19
Shreveport, La	0	0		0	0	0	5	0	1	0	1	0
South Bend, Ind	0	0		0	0	0	0	0	1	0	0	7
Spokane, Wash	0	0		0	8	0	1	0	3	0	0	0
Springfield, Ill	0	0		0	0	0	1	0	3	0	0	7
Springfield, Mass	0	0		0	2	0	2	0	3	0	0	2
Superior, Wis	0	0		0	0	0	0	0	0	0	0	2
Syracuse, N. Y	0	0		0	5	0	2	0	0	0	0	14
Tacoma, Wash	0	0		0	4	0	0	0	0	0	0	0
Tampa, Fla	0	0		0	0	0	5	0	0	0	0	0
Terre Haute, Ind	0	0		0	0	0	1	0	0	0	0	0
Topeka, Kans	0	0		0	0	0	0	0	2	0	0	4
Trenton, N. J	0	0		0	3	0	0	6	1	0	2	8
Washington, D. C	1	0		0	4	2	5	0	13	0	0	26
Wheeling, W. Va	0	0		0	0	0	2	0	1	0	0	1
Wichita, Kans	0	0		0	0	0	7	0	0	0	0	11
Wilmington, Del	0	0		0	0	0	1	0	0	0	0	1
Winston-Salem, N. C	0	0		0	0	0	0	0	0	0	0	0
Worcester, Mass	0	0		0	0	1	6	0	1	0	0	17

Dysentery, amebic—Cases: Los Angeles, 2; Missoula, 1; New York, 1; San Francisco, 2.

Dysentery, bacillary—Cases: Baltimore, 2; Boston, 1; Chicago, 2; Los Angeles, 7; Nashville, 1; New York, 15; Richmond, 2; San Francisco, 2.

Dysentery, unspecified—Cases San Antonio, 5; Sacramento, 2.

Leprosy—Cases: New York, 1.

Typhus fever—Cases: Birmingham, 2; Brunswick, 1; Charleston, S. C., 5, Dallas, 1; New Orleans, 1; New York, 1; San Antonio, 1; Savannah, 3; Tampa, 2.

Rates (annual basis) per 100,000 population for the group of 88 cities included in the preceding table (estimated population, 1942, 33,791,053)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping-cough cases
Week ended Aug. 22, 1942	6.17	3.70	1.08	30.09	35.80	30.09	0.15	4.17	192.73
Average for week, 1937-41	8.58	3.59	1.40	[1] 35.86	37.73	31.18	0.31	9.36	198.80

[1] Median.

PLAGUE INFECTION IN CALIFORNIA

Plague infection has been reported proved in pools of tissue and ectoparasites from rodents collected in California as follows:

Eldorado County.—In pools of tissue and fleas from ground squirrels, *C. beldingi*, and chipmunks as follows: July 27, tissue from 17 squirrels (1 found dead and 1 sick), 13 fleas from 30 squirrels, and 54 fleas from 69 squirrels; August 3, tissue from 10 squirrels; August 5, tissue from 5 squirrels, all taken from the premises of a dairy 3 miles north of Myers; August 5, tissue from 5 ground squirrels and 6 chipmunks (*Eutamias* sp.) taken from the Tawonga Boy's Camp, 3 miles north of Myers; August 6, tissue from 1 squirrel taken from the last named location, and from 10 squirrels taken 1 mile north of Myers; August 7, tissue from 15 squirrels taken 1 mile north of Myers.

Kern County.—June 9, in a pool of 200 lice from 73 ground squirrels, *C. beecheyi*, taken 1 mile east of Lebec (Castac Lake Area).

Los Angeles County.—In pools of fleas from ground squirrels, *C. beecheyi*, as follows: July 14, 350 fleas from 13 squirrels taken 2½ miles south of Gorman; July 23, 200 fleas from 17 squirrels taken 1 mile west of Gorman; July 27, 146 fleas from 4 squirrels taken one-half mile south of Ridge Tavern.

Monterey County.—In tissue and pools of fleas from ground squirrels, *C. beecheyi*, as follows: June 27, 201 fleas from 11 squirrels taken south of Gigling (Fort Ord); August 5, tissue from 1 squirrel and pool of 62 fleas from 6 squirrels, taken on the Fort Ord Military Reservation (Sewage Disposal Plant Area, Area E); August 6, 79 fleas from 13 squirrels taken 20 miles south of Salinas, and tissue from 2 squirrels and pool of 91 fleas from 36 squirrels, taken 16 miles south of Salinas; August 7, 183 fleas from 11 squirrels taken in the North Portion, Area E, of the Fort Ord Military Reservation, and tissue from 1 squirrel taken from Area D, of the Reservation.

Placer County.—June 23, in a pool of 28 fleas from 7 ground squirrels, *C. beecheyi*, taken from the Tahoe city dump, 1 mile north of Tahoe city.

San Bernardino County.—June 29, in a pool of 13 fleas from 15 golden mantled squirrels, *C. lateralis* sp., taken in Fawnskin Valley, 1 mile north of Fawnskin Post Office.

Santa Clara County.—July 31, in a pool of tissue from 5 ground squirrels, *C. beecheyi*, taken three-fourths mile east of Calaveras Dam.

Siskiyou County.—In pools of fleas from ground squirrels, *C. douglasii*, as follows: July 30, 200 fleas from 40 squirrels, taken 5 miles east of Callahan; July 31, 138 fleas from 22 squirrels taken 2 miles south of Etna.

TERRITORIES AND POSSESSIONS

Panama Canal Zone

Notifiable diseases—April 1942.—During the month of April 1942, certain notifiable diseases were reported in the Panama Canal Zone, and terminal cities and vicinities, as follows:

Disease	Panama		Colon		Canal Zone		Outside the Canal Zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	10		1		2		4		17	
Diptheria	2		4				3		9	
Dysentery (amebic)	1				3	1	3	1	7	2
Dysentery (bacillary)							10	7	10	7
Lethargic encephalitis							1	1	1	1
Malaria	10		3		226		151	2	[1] 390	2
Measles	2				44		5		51	
Mumps					3		2	2	5	2
Pneumonia		9		4	47	2		3	[2] 47	18
Tuberculosis		26		12	8	2		4	[2] 8	44
Typhoid fever					1		6	2	7	2
Whooping cough		2			4				[2] 4	2.

[1] Includes 86 recurrent cases.
[2] Cases reported in the Canal Zone only.

Virgin Islands of the United States

Notifiable diseases—April–June 1942.—During the months of April, May, and June 1942, cases of certain notifiable diseases were reported in the Virgin Islands as follows:

Disease	April	May	June	Disease	April	May	June
Dengue		1		Malaria	1	4	3
Filariasis	6	3	7	Measles			1
German measles	1			Mumps	31		2
Gonorrhea	13	13	16	Syphilis	65	18	16
Hookworm disease	5	7	2	Tetanus			1
Lymphogranuloma inguinale	1			Whooping cough			1

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended August 8, 1942.—During the week ended August 8, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		1	1	3	9				1	15
Chickenpox		2		20	71	6	10	4	30	143
Diphtheria		16	3	33		5	1	1		59
Dysentery	3			5						8
Encephalomyelitis							2			2
German measles				2	9		4		4	19
Influenza	6	1			1				6	14
Lethargic encephalitis						3				3
Measles	1	1		38	164	2	10	1	1	218
Mumps		9	2	10	135	12	11	17	93	289
Pneumonia	3				8		1			12
Poliomyelitis		6	12	10	2	2				32
Scarlet fever		4	5	9	57	10	14	9	18	126
Trachoma									1	1
Tuberculosis	3	3	12	162	70	59	4	7	22	342
Typhoid and paratyphoid fever				20	2	1		2	1	26
Undulant fever					1					1
Whooping cough				371	72	6		1	34	484
Other communicable diseases	3	9		2	206	1	3		7	231

Province of Alberta—Plague infection in fleas.—Under date of August 25, 1942, plague infection was reported found in fleas from wild rodents taken near Stanmore and Hanna, Province of Alberta, Canada.

CUBA

Habana—Communicable diseases—4 weeks ended July 26, 1942.—During the 4 weeks ended July 26, 1942, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	22	1	Poliomyelitis	6	1
Leprosy	2		Tuberculosis	6	
Malaria	18		Typhoid fever	30	2
Measles	14	2	Yaws	1	1

Provinces—Notifiable diseases—4 weeks ended June 20, 1942.—During the 4 weeks ended June 20, 1942, cases of certain notifiable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		2	2	3	1	4	12
Chickenpox		2			2	4	8
Diphtheria		22	1	1		2	26
Leprosy		4	1			1	6
Malaria	84	8		4	6	187	289
Measles	2	12		4			18
Poliomyelitis	1	5	4	1		39	50
Scarlet fever		1					1
Tuberculosis	18	16	12	26	20	22	114
Typhoid fever	10	59	9	50	16	29	173
Whooping cough				2			2

[1] Includes the city of Habana.

NOTE.—No report was received for the week ended June 20, 1942.

JAMAICA

Communicable diseases—4 weeks ended August 1, 1942.—During the 4 weeks ended August 1, 1942, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	9	4	Scarlet fever		1
Diphtheria	2	1	Tuberculosis	23	61
Dysentery	6	7	Typhoid fever	3	48
Leprosy		1	Typhus fever	5	4

NEW ZEALAND

Infectious diseases—Year ended March 31, 1942.—For the year ended March 31, 1942, certain infectious diseases were reported in New Zealand (exclusive of Maoris) as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis [1]	210	33	Puerperal sepsis		17
Diphtheria	383	17	Scarlet fever	338	1
Lethargic encephalitis	5		Tuberculosis		597
Measles		4	Typhoid fever	26	4
Poliomyelitis	4		Whooping cough		67

[1] Includes 47 Maori cases and 8 deaths.

Vital statistics—Year ended March 31, 1942.—Following are vital statistics for New Zealand (exclusive of Maoris) for the year ended March 31, 1942:

Births per 1,000 population	22.81
Deaths per 1,000 population	9.81
Infant mortality rate per 1,000 live births	29.74
Maternal deaths per 1,000 live births	3.36

NOTE.—The estimated population for 1941 is 1,638,620.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-named diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Madagascar.—During the period August 1–10, 1942, 2 cases of plague were reported in Madagascar.

Senegal—Tivaouane.—During the week ended August 29, 1942, 4 cases of plague, including 3 suspected cases, were reported in Tivaouane, Senegal.

Typhus Fever

Algeria.—During the period July 21–31, 1942, 502 cases of typhus fever were reported in Algeria.

Morocco.—During the week ended August 15, 1942, 78 cases of typhus fever were reported in Morocco.

Rumania.—Typhus fever was reported in Rumania as follows: Week ended August 15, 1942, 6 cases; week ended August 22, 13 cases.

Tunisia.—During the period August 1–10, 1942, 156 cases of typhus fever were reported in Tunisia. For the preceding 10-day period, 219 cases were reported.

Yellow Fever

Nigeria—Udi.—During the week ended August 1, 1942, 1 suspected case of yellow fever was reported in Udi, near Enugu, Nigeria.

Sierra Leone—Freetown.—On July 19, 1942, 1 suspected case of yellow fever with 1 death was reported in Freetown, Sierra Leone.

COURT DECISIONS ON PUBLIC HEALTH

Milk—city ordinance—provisions regarding producer's permit fee and tuberculin testing upheld.—(Kansas Supreme Court; *Dorssom et al.* v. *City of Atchison et al.*, 124 P.2d 475; decided April 11, 1942.) In 1938 the city of Atchison enacted an ordinance regulating the production and sale of milk. The plaintiffs, who were farmers engaged in producing milk which was sold to distributors in the city, instituted an action for a declaratory judgment to determine the validity of certain parts of the ordinance.

Section 3 of the ordinance made it unlawful for any person not possessing a permit from the health officer to bring into the city or offer for sale or sell any milk product and further provided that each pro-

ducer of milk sold or distributed within the city should pay annually a permit fee of $2 for two cows or less and 50 cents for each additional cow, the payment thereof to include the right to distribute milk or milk products. The question was presented as to whether the city had authority to enact an ordinance which charged producers a permit or license fee, the plaintiffs directing attention to a statute which provided that the powers of first-, second-, and third-class cities to impose license or occupation taxes upon peddlers and venders should not be construed so as to apply to or create the power to impose license or occupation taxes upon producers and growers engaged in the sale of farm or garden products or fruits grown within the State. It was contended that under this statute the city was forbidden to impose any license or occupation tax. The holding of the Supreme Court of Kansas was that the fee imposed by the ordinance was neither a license tax nor an occupation tax within the purview of the said statute and that the section of the ordinance referred to was not to be stricken down on account of the grounds asserted. The court noted that power had been granted by statute to first-class cities to enact ordinances in order to secure the public health and to prevent the introduction and spread of contagion and stated that in its judgment the statute relied on by the plaintiffs was never intended to prevent enforcement of health regulations. "Here," said the court, "there is no claim made that the fee is unreasonable, or that it is a device for revenue and not to meet expenses of inspection. It is also clear from the ordinance the fee is not fixed on the right of the producer to peddle or vend his milk, it is a measure calculated only to meet expense of determining that the product he sells complies with specified conditions to insure its fitness for human consumption. '

Another portion of the ordinance complained of was item 1-r of section 7, under which item it was required that, before milk was sold, the herd should, at least once every 12 months, be given a tuberculin test by a licensed veterinarian approved by the State livestock sanitary commission. Respecting this, the questions presented were whether the ordinance required the producer to provide at his own expense a certificate that his cows had been tuberculin tested and whether the city had authority to delegate its inspectional powers to third persons.

The supreme court noted a statute which, among other things, provided that the livestock sanitary commissioner should, whenever he deemed it necessary, formulate the rules under which the tuberculin test should be applied and that no person other than one indicated by the commissioner should inject any tuberculin into any animal. This statute also gave a city power by ordinance to require the owner of any dairy herd offering for sale any milk within the city to first

subject the cows to examination and test for tuberculosis under the direction of and in accordance with the rules prescribed by the livestock sanitary commissioner. The court said that it appeared that the city had power to require tuberculin testing and that compliance with the requirement was a condition precedent to the right to sell milk in the city. The city's mere silence in not providing that the cost should be paid by the applicant did not, according to the court, make that part of the ordinance bad. "A fair interpretation of the ordinance is that the applicant must meet the conditions precedent at his own expense."

Neither could the court agree with the plaintiffs that the city had attempted to delegate a delegated power in providing that the tuberculin testing should be by a licensed veterinarian approved by the livestock sanitary commission. The court said that it appeared from the statute above noted that such a person would be the only person authorized to make the test. The provision was held to be a proper exercise of the city's legislative power.

Poultry—slaughter—cancellation of permit—action of local board of health upheld.—(New Jersey Supreme Court; *Kurinsky* v. *Board of Health of Lakewood Tp. et al.*, 24 A.2d 803; decided March 2, 1942.) A 1930 ordinance of a township board of health provided: "No person * * * shall slaughter * * * any chickens, ducks, geese, pigeons, and any other domestic fowl, except for domestic or family use, and not for hotel or commercial use, within the limits of the town, unless a permit is first had and obtained from the board." In addition the board had adopted in 1932 other and more detailed regulations concerning the slaughter and housing of poultry. In an action by the prosecutor whose poultry slaughtering permit had been cancelled by the township board of health, there was brought before the New Jersey Supreme Court for review (a) the action, orders, and resolutions of the board in cancelling the permit and (b) the above-quoted ordinance. It appeared that the prosecutor had been engaged in the poultry business in the township for about 17 years. In 1933 he obtained a permit after having been advised that he was violating the ordinance in slaughtering poultry without one. The permit was issued for a period of 1 month and was renewed monthly until September 1941 when further renewal was denied after due notice of the contemplated action had been given. The renewals had not been continuous, there being at least 2 periods, 1 for about 6 months and another for about 4 months, when the renewals were denied, apparently due to prosecutor's failure to comply with the sanitary requirements.

The supreme court said that the proofs abundantly supported the action of the board of health in cancelling the prosecutor's permit because of his failure to observe the provisions of the ordinance and

regulations. It was pointed out that local boards of health were given wide powers to safeguard the public health generally and, among other things, were specifically authorized to regulate, control, or prohibit the keeping or slaughtering of animals. The licensing of poultry markets and slaughterhouses, said the court, rests in the sound discretion of the boards of health. "We find that there was no abuse of sound discretion in the case at bar." Tested by the rule that the action of a board of health in adopting measures for public protection would not be set aside by the court where the board had acted reasonably upon evidence which might satisfy a reasonable man, the court was satisfied that the action complained of was reasonable under the facts and was not arbitrary or capricious but, on the contrary, was fully justified.

The court held that there was no merit in the prosecutor's contentions (a) that the above-quoted ordinance was void because not setting up a standard to govern the board in passing upon applications for permits and (b) that the board's action in refusing a permit was illegal as being an unlawful restriction of prosecutor in the use of his property by arbitrary action without a comprehensive plan of zoning the entire community. According to the court the standard governing the board was not only the ordinance in question but also the regulations of the board and the sanitary code of the State department of health, all looking to the preservation of the health of the community. "The repeated failure to comply with the law by the prosecutor is sufficient to withhold from him a license to continue in the business without the necessity of adopting a zone within which no permits could be granted."

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Public Health

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FREQUENCY AND VOLUME OF HOSPITAL CARE FOR SPECIFIC DISEASES IN RELATION TO ALL ILLNESSES AMONG 9,000 FAMILIES, BASED ON NATION-WIDE PERIODIC CANVASSES, 1928–31 [1]

By SELWYN D. COLLINS, *Principal Statistician, United States Public Health Service*

CONTENTS

The amount of hospital care received by a given population group depends to a considerable extent upon the circumstances under which such care can be obtained. Hospital admission rates are much higher in large cities than in rural areas, probably reflecting in part the relative paucity of facilities in the country together with reluctance to go to a distant hospital. The economic factor is also important, although it is masked by the fact that in large cities low income families often receive free hospital care; in terms of admissions and particularly of days of care the urban low income group gets more than the middle and as much or more than the high income groups. In rural areas where free care is relatively rare, the hospital admission rate rises rather regularly with income. The importance of the economic factor is further indicated by hospitalization among persons with prepaid care such as that provided by hospital service plans (*34*); the annual admission rate among these persons is roughly 50 percent higher than for the country as a whole and also considerably higher

[1] From Statistical Investigations, Division of Public Health Methods, National Institute of Health.

These are the first two sections of the eighteenth of a series of papers on sickness and medical care in this group of families (*1–17*). The remaining five sections, Comparison of hospitalized illness and general mortality, Distribution of cases by days of hospital care, Type of hospital, accommodations, and public clinic service, Summary, and References, will be published in the next issue of PUBLIC HEALTH REPORTS. The survey of these families was organized and conducted by the Committee on the Costs of Medical Care, the tabulation was done under a cooperative arrangement between the Committee and the Public Health Service. Committee publications based on the results deal primarily with costs and Public Health Service publications primarily with the incidence of illness and the extent and kind of medical care, without regard to costs. As costs are meaningless without some knowledge of the extent and nature of the service received, there is inevitably some overlapping. The Committee staff, particularly Dr. I. S. Falk and Miss Margaret Klem, cooperated in the tabulation of the data.

Special thanks are due to Dr. Mary Gover and Miss Clara E. Councell, who assisted in the analysis, to Mrs. Lily Vansee Welch, who was in immediate charge of tabulating the data, and to other members of the statistical staff of the Public Health Service for advice and assistance in the preparation of the study.

than for large cities. This increased rate of hospitalization is in spite of the terms of the contract which exclude certain diagnoses from coverage.

The United States Army (*18*) and Navy (*19*) offer illustrations of extensive hospital facilities readily available without cost to the patient. In these services hospital admissions and days of care even in times of peace are far above those for civilians; in fact the question of whether the patient is to be hospitalized is largely a matter of convenience to him and the attending physician. While most estimates for the general civilian population indicate annual rates of roughly 60 to 75 hospital admissions per 1,000 and about 1 hospital day per person (exclusive of days in mental and tuberculosis hospitals) the peacetime army, in spite of favorable age distribution and presumably better than average health, receives about 10 days of hospital care per soldier per year. While the civilian annual rate of 1 hospital day per person amounts to only about one-eighth of the days of inability to work, in the Army about nine-tenths of the days excused from duty on account of illness are spent in hospitals. In the Navy where the men receive annually 6 to 7 days of hospital care per person, about four-fifths of the days excused from duty on account of illness are spent in a naval hospital or on a hospital ship, but of the total admissions to sick report only about half are admitted to a hospital.[2]

It is not intended to suggest that the civilian population needs or could profitably use as much hospital care as is received in the peacetime Army and Navy, for a large proportion of civilian patients can be properly treated at home for minor ailments and during convalescence. However, the various figures here cited indicate that the amount of hospital care used by a given population group varies largely with the convenience of hospital facilities, the ability to obtain the use of those facilities, and the habits of physicians and patients with respect to hospital care.

The present paper deals with hospital admission rates and days of care for specific diseases in a surveyed population considered as a whole, with special reference to the total illness suffered by the same group. A later paper will be devoted to variations in hospital rates with family income and in rural, urban, and metropolitan areas.

I. SOURCE AND CHARACTER OF DATA

In the study of illness in a group of families in 18 States[3] that was made by the Committee on the Costs of Medical Care (*24*) and

[2] No figure for admissions to hospitals is available for the Army.

[3] The 18 States sampled and the number of canvassed families were as follows: California (890), Colorado (386), Connecticut (160), District of Columbia (99); Georgia (544), Illinois (463), Indiana (494), Kansas (301), Massachusetts (287), Michigan (329), Minnesota (224), New York (1,710), Ohio (1,148), Tennessee (212), Virginia (412), Washington (551), West Virginia (318), Wisconsin (290). Further details about the distribution of the canvassed population are included in a preceding paper (*1*).

the United States Public Health Service, the record for each illness included a statement of the days of hospital care received during the 12-month study period and the type of hospital involved.

The composition and characteristics of the group of 8,758 white families which were kept under observation for 12 consecutive months in the years 1928–31 have been considered in some detail in the first report in the series (*1*). These families, including a total of 39,185 individuals, resided in 130 localities in 18 States representing all geographic sections. Every size of community was included, from metropolitan districts to small industrial and agricultural towns and rural unincorporated areas.[4] With respect to income, the distribution was reasonably similar to the estimated distribution of the general population of the United States at the time of survey.

Each family was visited at intervals of 2 to 4 months for a period long enough to obtain a sickness record for 12 consecutive months. On the first call a record was made of the number of members of the household, together with sex, age, marital status, occupation, and other facts about each person. On succeeding visits the canvasser recorded all illness that had occurred since the preceding call, with such pertinent facts about each case as the date of onset; the duration in terms of the presence of symptoms, the days of inability to pursue usual activities (disability), the days confined to bed, and finally the days confined to a hospital and the days of nursing care; the nature of any surgical procedures used; and other medical care received. Data about persons who were still sick at the preceding visit were brought up to date and when completed the termination of the case was entered.

Definition of illness and hospital care as recorded in the survey.—An illness, for the purpose of this study, was defined as any symptom, disorder, or affection which persisted for one or more days or for which medical service[5] was received or medicine purchased. Illness included the results of both disease and injury. What was actually included as illness, however, was necessarily influenced not only by the informant's (usually the housewife's) conception of sickness but also by her memory. With visits as infrequent as 2 to 4 months, it was inevitable that many of the unattended, nondisabling illnesses would be terminated and forgotten before the next visit of the enumerator. The relatively few but long institutional cases which are largely missed in family surveys would add little to the hospital admission rate but would greatly increase the days of hospital and institutional care. For this reason many of the data in this report

[4] Every community that was included in the study had either a local health department or some other organization employing a visiting nurse or both; therefore, the most rural areas with no organized community services are not represented.

[5] Exclusive of dental services, eye refractions, immunizations, and health examinations rendered when no symptoms were present.

are exclusive of cases in resident institutions such as those for mental diseases and tuberculosis.

An illness was considered as attended if any type of practitioner was called in or consulted about the case, including all hospital cases. The case was considered as hospitalized if the patient stayed in the hospital for one or more days, and included any who stayed over night and a few who did not stay over night but were there for a sufficient part of a day to have been assigned a bed. Newborn infants were not counted as admissions unless they were reported as sick. If an illness had two or more diagnoses, all were considered as being hospitalized even when the treatment pertained largely to only one disease; however, in counting total hospital cases for all causes each period of hospitalization was counted only once no matter how many diagnoses were involved.

In computing hospital admissions per 1,000 population, illnesses that originated prior to but were in the hospital during the study year are included along with cases having their onset within the period of observation; the inclusion of the illnesses with prior onset seemed necessary to give proper representation to chronic ailments. The only date available was the onset of symptoms (nondisabling or disabling); therefore, prior onset does not necessarily mean prior hospitalization. Seven percent of all illnesses and 11 percent of hospitalized illnesses had their onset of symptoms prior to the study year; the percentage of cases actually hospitalized prior to the study year was presumably much smaller.

Hospital days refer in all instances to those *within the 12-month study period.* In computing average days per case, both complete and incomplete cases [6] are included as cases but the days refer to those within the study year only. The incomplete cases (those with prior onset and those still sick at the last report) usually average considerably longer durations than the complete cases and their exclusion would bias the results toward shorter averages. Hospital cases with an unknown number of days were put in at the average hospital days per case of the same diagnosis, exclusive of cases hospitalized throughout the year and of a few other exceptionally long cases.

Classification of causes of illness.—The diagnosis as reported by the family informant was submitted to the attending physician for confirmation or correction and his diagnosis substituted for the one given by the family. While reports could not be obtained from all attending physicians, the replies indicated that the housewife usually reported with reasonable accuracy the diagnosis which the physician had given to the family.[7]

[6] Except that the few cases hospitalized throughout the year are usually excluded.

[7] See comparison of diagnoses reported by families and by physicians in the Health survey of 1935–36 (30, table 2).

Considering an illness in the sense of a continuous period of sickness, only 4.3 percent of all illnesses and 11.2 percent of hospitalized illnesses were designated as due to more than one cause. In general, the more important or more serious cause was assigned as primary, except where a disease like pneumonia is commonly recognized as following measles or influenza, in which case the antecedent condition was taken as primary.[8] In this paper, some tables are based on sole or primary causes only and others include the contributory causes; each table indicates which procedure was followed.

II. EXTENT OF HOSPITAL CARE AS MEASURED BY VARIOUS TYPES OF RATES

Institutions for the care of the sick may be classified as nonresident and resident. The nonresident group includes general and special hospitals where individuals go for more or less temporary illness. Resident institutions are those for the care of diseases of such long duration that the patient virtually becomes a resident of the hospital and tends to lose his identity as a member of a family. This loss of family connections may come from the break-up of the family if the wife or the chief breadwinner is hospitalized, but where a grandparent is involved he or she may merely cease to be considered a part of the family. Because of this situation it is not feasible to obtain by house-to-house canvass a complete record of the extent of hospitalization in resident institutions. Therefore, the present study of hospital care is limited largely to that in nonresident hospitals reported under such terms as general, women's, children's, eye-ear-nose-throat, and communicable or isolation. For certain purposes the only exclusions are of cases hospitalized throughout the study year; other tabulations exclude all cases and days in hospitals for mental and nervous diseases, for tuberculosis, and for the resident care of other chronic diseases. This procedure omits a few short cases in these institutions and retains a few long ones in general hospitals but mainly eliminates the long chronic cases. The exclusions are relatively unimportant in current admissions but are very important in hospital days.

ALL TYPES OF HOSPITAL CASES

Summary of rates[9] *and comparison with other studies.*—During the 12-month study period there were, exclusive of cases hospitalized

[8] Further details on the method of classifying the causes of illness are included in the first report in the series (*1*).

[9] The rates for the surveyed families quoted in this section have been adjusted to the age distribution of the white population of the United States in 1930. In other words, the rates are corrected for the fact that the surveyed sample did not have the same age distribution as the general population of the United States. Percentages of cases and of days quoted in this section are computed from adjusted rates rather than from the actual numbers of cases and days; similarly, days per case are computed from the adjusted rates. In no instance are these measures radically different from similar computations based on the actual numbers of cases; both results are shown in table 1. Rates published in the Committee report (*24*) were adjusted for income and size of city but not for age.

throughout the year, 61.6 hospital cases and 886 hospital days per 1,000 persons under observation.[10] Thus the average stay per case in hospitals of all kinds, excluding year-long cases, was 14.4 days. Of the total illnesses 7.5 percent were hospitalized and of the total days of sickness (disabling and nondisabling) 3.0 percent were spent in a hospital. Of the cases that caused inability to work or pursue other usual activities (disabling) for one or more days, 12.5 percent were hospitalized and of the total disabled days, 11.8 percent were spent in a hospital. Of the total cases that confined the patient to bed for one or more days, 14.9 percent were hospitalized and of the total days confined to bed 23.4 percent were spent in a hospital.[11]

The figures on hospitalization from this relatively small survey in which there was a total of only 2,357 hospital cases may be compared with rates obtained from the Annual Hospital Survey by the American Medical Association (*27*). While that survey is primarily a record of hospital facilities, it gives also the number of admissions during the year and the average number of patients in the hospital, from which the total days of hospital care can be computed. Since the family survey data include few patients in mental and tuberculosis hospitals, patients in these types of institutions are excluded from both reports.[12] During the years 1929 and 1930 to which the bulk of the family survey data pertain, the days of hospital care, exclusive of those in mental[13] and tuberculosis hospitals, as recorded in the American Medical Association report, amounted to 851 per 1,000 population as compared with 775 for the surveyed families. The American Medical Association report includes admissions only since 1931, and admissions to mental hospitals only since 1932. In 1932 the admissions reported, exclusive of those to mental and tuberculosis hospitals, indicate a rate of 55.7 per 1,000 population, as compared with 60.1 in the surveyed families. The average stay in the hospital, exclusive of mental and tuberculosis hospitals, was 15.4 days per case in the American Medical Association[14] data as compared with 12.9 for the surveyed families.

[10] The inclusion of the 16 cases reported as hospitalized throughout the year gives total rates of 61 9 cases and 1,029 hospital days per 1,000 persons under observation, with an average stay of 16 6 days per hospital case.

[11] In this study a day in the hospital is always counted as a day in bed even though the patient was not confined to his hospital bed throughout the day, similarly, a day in bed is always counted as a day of disability. The percentages quoted are based on figures from which cases hospitalized throughout the year are excluded from total, disabling, and bed cases and days as well as hospital cases and days

[12] The American Medical Association report does not show separately the hospitals for other chronic diseases, so they are not excluded from the family survey data.

[13] Mental hospitals as used here and elsewhere in this paper include both mental and nervous.

[14] Hospital admissions in the American Medical Association report apparently are exclusive of newborn infants which was the practice in the family survey also.

The great effect upon the days of hospitalization per 1,000 of the long chronic cases hospitalized in mental and tuberculosis hospitals is indicated by the fact that for 1929–30 the total annual hospital days per 1,000 population were 2,215, of which 1,205 were in mental and 159 in tuberculosis hospitals. Days of hospital care for 1932 were about the same, 2,361 per 1,000 for all hospitals and 857 for all except mental and tuber culosis hospitals The admission rate for 1932 was 57.8 per 1,000 for all hospitals, with only 1 86 per 1,000

The recent hospital survey of public general hospitals in Ontario (*31*) affords data for another comparison. The annual rate for 1929–30 in these hospitals was 57.1 patients treated and 802 hospital days [15] per 1,000 population, as compared with 60.1 cases and 775 hospital days in the present family survey when data for mental and tuberculosis hospitals are excluded.[16]

Hospitalization has apparently increased considerably during the past decade. Considering hospitals exclusive of mental and tuberculosis institutions, the American Medical Association data indicate annual hospital days per 1,000 population of 948 for 1938 and 1,021 for 1940, as compared with 851 for 1929–30 and 857 for 1932. Admissions to the same types of hospitals amounted in 1938 to 70.3 and in 1940 to 74.5 cases per 1,000 population as compared with 55.7 in 1932.[17] The Canadian report (*31*) shows an increase in patients treated in public general hospitals in the Province of Ontario from 57.1 per 1,000 population in 1929–30 and 56.7 in 1932 to 66.9 in 1938; hospital days per 1,000 in Ontario increased from 802 in 1929–30 and 779 in 1932 to 864 in 1938. The above rates are exclusive of the newborn, but the Ontario report gives data back to 1900 with the newborn included. Patients treated in public general hospitals in Ontario amounted to 14 per 1,000 population in 1900, 21 in 1910, 46 in 1920, 65 in 1930 and 76 in 1938; hospital days per 1,000 in the same hospitals were 332 in 1900, 405 in 1910, 679 in 1920, 882 in 1930, and 958 in 1938. As the use of hospitals has increased by less severe cases being hospitalized, the hospital days per case have gradually decreased from 24.5 in 1900 to 12.7 in 1938.

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for mental and 0.75 for tuberculosis hospitals. The hospital days per case in 1932 were 40.8 for all hospitals and 15 4 for all except mental and tuberculosis hospitals.

All of the American Medical Association hospital data refer only to registered hospitals, that is, hospitals recognized by the American Medical Association and included in their report. Data for unregistered hospitals for 1936 are given in a Public Health Bulletin on hospital facilities (*28*, p. 27). While the unregistered hospitals amounted to 23 percent of the total of registered and unregistered hospitals, beds in unregistered hospitals amounted to only 3.5 percent of total beds, patients admitted during the year to only 2.4 percent of the total, and days of hospitalization to only 1.6 percent of total days of hospital care. Although the number of unregistered hospitals is considerable they are small institutions which furnish only a small proportion of the total hospital service and can be neglected in considering the total.

[15] The rates for Ontario are based on admissions exclusive of newborn infants since that was the practice in the family survey except where the infant was reported as sick.

[16] The Health Survey of 1935–36 covering 83 cities and towns (*30*) collected data on hospital cases and days. Year-long cases were considerably underreported. Because of the emphasis placed upon cases disabling for 7 days or longer, hospital cases of less than 7 days were also underreported. When the data are limited to cases in the hospital for 7 days but less than a year the rates were as follows: annual hospital days per 1,000 population, 801 for the present study and 841 for the Health Survey; hospital admissions, 33 cases per 1,000 during the year for both studies; and hospital days per case, 24.2 for the present study and 25.4 for the Health Survey.

[17] Considering the American Medical Association data for all types of hospitals, the annual days of hospital care amounted in 1938 to 2,715 and in 1940 to 2,845 per 1,000 population, as compared with 2,215 in 1929–30 and 2,361 in 1932. Admissions to all hospitals amounted in 1938 to 72.6 and in 1940 to 76.6 per 1,000 population as compared with 57.8 in 1932.

TABLE 1.—*Age and sex incidence of hospitalized illness from all causes as measured by various types of rates—8,758 canvassed white families in 18 States during 12 consecutive months 1928–31*—Continued

Sex and type of rate	All ages[1] Number of cases or days	All ages[1] Adjusted[2]	All ages[1] Crude	Age[7] Under 5	5–9	10–14	15–19	20–24	25–34	35–44	45–54	55–64	65 and over
Percent of total cases[4] that were hospitalized—Con.													
Surgical													
Both sexes, all causes	2 439	60.6	59.5	49.5	57.9	58.5	59.6	65.4	62.5	65.9	60.7	60.7	66.7
Male, all causes	1 187	53.0	52.1	48.1	54.3	46.1	47.4	54.2	52.6	56.7	54.4	55.9	71.4
Female, all causes	1 252	67.3	66.6	51.7	62.3	72.6	72.0	72.2	67.9	72.4	66.2	66.7	63.9
Female, all except genital and puerperal	1 068	64.7	64.2	52.4	62.3	72.6	71.2	68.9	64.7	64.9	64.2	64.0	61.8
Nonsurgical[3] except institutional													
Both sexes, all causes	30 224	3.0	2.7	1.4	1.2	1.0	2.5	6.8	6.3	3.3	2.3	2.1	2.5
Male all causes	13 370	2.0	1.8	1.5	1.1	1.3	2.1	2.5	2.0	2.3	1.9	2.6	4.0
Female all causes	16 844	3.6	3.4	1.1	1.2	.8	2.8	8.5	8.2	3.9	2.7	1.7	1.6
Female all except genital and puerperal	15 488	1.6	1.5	1.1	1.2	.8	2.0	1.7	2.0	1.4	2.4	1.8	1.6
Percent of disabling cases[4] that were hospitalized													
Total													
Both sexes, all causes	19 871	12.5	11.8	7.5	8.6	9.3	12.2	19.3	19.0	14.7	11.5	10.5	12.4
Male, all causes	8 920	10.6	10.0	8.6	9.0	8.0	10.9	13.4	11.9	11.9	9.7	11.5	15.9
Female, all causes	10 942	13.8	13.2	6.1	8.3	10.6	13.2	21.7	22.2	16.6	13.1	9.5	10.3
Female all except genital and puerperal	9 701	10.2	9.9	6.1	8.3	10.7	12.5	13.8	12.8	10.2	12.0	9.0	9.8
Percent of bed cases[4] that were hospitalized													
Total													
Both sexes, all causes	16 712	14.9	14.0	8.2	11.1	12.0	15.8	22.3	21.5	17.0	13.5	13.1	13.7
Male, all causes	7 153	13.3	12.4	9.4	11.6	10.5	14.8	17.8	15.2	15.3	12.3	15.5	19.0
Female, all causes	9 550	15.7	15.2	6.7	10.7	13.5	16.5	23.8	23.8	18.0	14.4	11.0	10.9
Female, all except genital and puerperal	8 333	11.8	11.5	6.7	10.7	13.6	15.8	15.8	14.2	11.3	13.2	10.5	10.4
Surgical													
Both sexes, all causes	1 919	77.7	75.7	64.6	68.8	75.3	81.8	76.9	[illegible]	84.7	88.0	90.2	95.0
Male, all causes	865	73.8	71.4	64.5	67.3	65.4	73.5	74.3	71.0	84.2	84.1	90.5	100.0
Female, all causes	1 054	80.8	79.1	64.7	70.6	84.5	88.5	78.1	78.8	85.0	91.1	90.0	92.0
Female, all except genital and puerperal	882	79.6	77.8	64.7	70.6	84.5	88.1	73.7	79.1	81.0	91.5	88.9	91.3
Nonsurgical[3] except institutional													
Both sexes all causes	14 720	6.2	5.5	2.8	2.1	2.0	5.4	13.0	12.6	7.2	5.5	5.4	5.1
Male all causes	6 256	4.4	3.8	3.2	2.1	2.5	4.9	5.6	4.6	5.4	4.7	6.7	9.0
Female all causes	8 455	7.2	6.8	2.2	2.1	1.5	5.8	15.4	15.5	8.3	6.2	4.4	3.1
Female all except genital and puerperal	7 410	3.4	3.1	2.2	2.1	1.5	4.1	3.8	4.4	3.3	5.6	4.4	3.1
Percent of sick days[4] that were hospital days													
Total													
Both sexes, all causes	1 007 697	3.0	3.1	2.5	2.7	3.7	4.0	5.2	4.4	3.0	2.0	1.8	2.6
Male, all causes	401 519	3.4	3.3	3.1	[illegible]	3.2	5.0	4.3	4.1	3.1	2.0	2.8	4.7
Female, all causes	605 903	2.7	2.9	1.3	2.6	4.1	3.2	5.5	4.5	3.0	2.0	1.0	1.4
Female, all except genital and puerperal	540 470	2.0	2.2	1.3	2.6	4.2	2.9	3.1	2.5	2.0	1.9	1.0	1.3

Percent of disabled days [4] that were hospital days													
Total													
Both sexes, all causes	277 962	11 8	11 2	4	5.8	10 1	14 4	17 4	16.4	13 9	11 7	10 4	10.3
Male, all causes	128 520	11 4	10 2	9	5.9	8 2	16 2	12 4	12.8	11 5	9 8	12 3	16.4
Female, all causes	149 365	11 9	11.8	0	5.8	12 0	12.5	19 6	18 6	15 8	13 5	7 9	6 0
Female, all except genital and puerperal	128 036	9 3	9 1	0	5.8	12.1	11 9	13 7	12.4	11.7	12.7	7 5	5.8
Percent of bed days [4] that were hospital days													
Total													
Both sexes, all causes	136 399	23 4	22.8	1	15.3	22.6	28.7	36 1	30 8	26 8	22.1	21 8	17 8
Male, all causes	54 621	27 0	24 0	3	15 7	19 0	33 8	35 6	30 4	29 9	25.0	33.8	35 0
Female, all causes	81 532	20 9	21 6	2	14 9	25 9	23 9	36 3	31 0	25.4	20 5	12 2	9 1
Female, all except genital and puerperal	67 236	16 8	17 4	3	14 9	25 9	23 3	30 4	23.3	18.7	19 0	11 7	8 8
Hospital days per hospital case													
Total													
Both sexes, all causes	2 341	14 4	13 3	5	8 0	13 2	14 4	12 7	13 2	14.6	17 0	21 5	28.1
Male, all causes	890	17 3	14.7	5	7 9	12 2	20 4	13 7	17 3	15 5	17 5	27 0	38 3
Female, all causes	1 447	12 8	12.2	8	8 2	13 9	10 4	12 4	12 2	14 2	16 8	14 8	18 5
Female, all except genital and puerperal	956	13 1	12 2	8	8 2	13 9	10 4	12 7	13 0	15 7	16 9	14 8	18.8
Surgical													
Both sexes, all causes	1 452	10 4	8 9	0	3 8	7 2	7 1	12 2	9 9	12 8	15 6	17 0	25 2
Male, all causes	618	11 2	9 2	1	4 2	10 8	6 3	15 1	9 9	12 7	13 9	20 7	30 8
Female, all causes	834	10 0	8 7	3	3 5	4 7	7 7	10 9	9 9	12 8	16 7	13 1	21 6
Female, all except genital and puerperal	686	9 3	7 9	3	3.5	4 7	7 8	10 3	9 0	12 3	16 3	12 9	22.4
Nonsurgical [3] except institutional													
Both sexes, all causes	816	14 7	15 2	6	21 9	21 5	12 1	11 8	12 3	13 6	13 6	15 5	23 4
Male, all causes	240	19 7	19 3	6	20 4	17 6	14 6	9 8	20 0	15 2	18 8	16.3	31 4
Female, all causes	572	12 6	13 0	4	23 4	28 0	10 6	12.1	11 4	12.9	10 5	14 5	11 0
Female all except genital and puerperal	229	13 8	14 7	4	23 4	28 0	10 3	11 7	9 8	14 9	10 5	14 5	11 0
Hospital nursing cases [5] per 1,000 population dur year													
Total													
Both sexes, all causes	475	13 6	12 3	3	7 3	7 0	10 2	15 6	17 9	16 7	14 6	14 9	27 1
Male all causes	165	10 0	8 7	1	8 5	6 5	7 9	10 1	7 9	8 7	9 2	14 9	32.0
Female, all causes	309	16 9	15 7	3	6 2	7 5	12 5	19 6	25 3	24 7	21 3	14 9	23 2
Female, all except genital and puerperal	212	11 9	10 8	3	6.2	7 5	11 8	13 9	10 8	12 9	17 9	13 5	23.2
Surgical													
Both sexes, all causes	344	9 8	8 9	0	5.8	6 6	7 5	11 8	11 3	12.3	10 1	12.2	18.0
Male, all causes	118	6 9	6 2	3	6 4	5 6	3 9	8 9	5 8	6 4	6 5	11 2	16.0
Female, all causes	226	12 5	11 5	7	5 2	7 5	11 2	13 9	15 4	18 3	14 6	13 5	19 6
Female, all except genital and puerperal	180	10 1	9 2	7	5 2	7 5	11 2	12 2	9 9	11 5	12 0	12 0	19 6
Nonsurgical [3] except institutional													
Both sexes, all causes	125	3 6	3 2	4	1 6	4	2.3	3 3	6 4	4 4	4 2	1 4	9 0
Male, all causes	44	2 8	2.3	8	2.1	9	3 3	1 1	2 1	2 3	2.2	2.5	16.0
Female all causes	80	4 2	4 1	6	1 0		1 3	4 9	9 6	6 4	6 6	- - -	3 6
Female, all except genital and puerperal	29	1 6	1 5	6	1.0	--	7	8	6	1 4	6.0	- - -	3 6
Hospital nursing days [6] per 1 000 population dur year													
Total													
Both sexes all causes	3 920	119 8	101 7	5	38 8	32 4	94 4	0	138 3	169 3	133 1	151 4	296.6
Male all causes	1 355	91.3	71 7	5	59 6	30 0	79 9	9	44 1	82 9	75 9	140 6	254 7
Female, all causes	2,547	146 8	129 8	0	18 7	34 8	109 0	5	245 6	256 5	203 2	164 4	244.2
Female, all except genital and puerperal	1 583	97 3	80 7	0	18 7	34.8	107 7	5	76 0	120 6	178 6	134 5	244 2

footnotes at end of table

TABLE Age and sex incidence of hospitalized illness from all causes as measured by various types of rates—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31—Continued

... and type of rate	All ages[1] Number of cases or days	Adjusted[2]	Crude	Age[7] Under 5	5–9	10–14	15–19	20–24	25–34	35–44	45–54	55–64	65 and over
...le													
...n sexes, all causes	2,788	86.0	72.3	13.8	32.0	31.7	52.1	110.0	77.8	129.0	106.0	129.7	226.5
...ale, all causes	974	65.8	51.5	17.8	47.2	28.7	26.2	153.2	37.9	58.7	50.9	102.0	242.6
...ale, all causes	1,814	107.6	92.4	9.7	17.3	34.8	78.1	78.4	1[illegible].5	199.9	171.3	162.9	217.5
...le, all except genital and puerperal	1,322	82.1	67.4	9.7	17.3	34.8	78.1	69.4	62.4	107.1	147.4	133.0	217.5
...ical[3] except institutional:													
...sexes, all causes	1,056	31.1	27.4	14.7	6.8	.7	39.3	44.8	59.9	40.3	16.1	12.9	68.1
..., all causes	320	21.6	16.9	10.7	12.4	1.3	47.8	15.7	6.2	24.2	3.3	23.6	121.3
...ale, all causes	718	38.1	36.6	12.3	1.4	----	30.9	66.1	99.8	56.6	31.9	----	26.7
...ale, all except genital and puerperal	246	14.3	12.5	12.3	1.4	----	29.5	17.1	12.7	13.6	31.2	----	26.7
...re of ...spital cases that had a special nurse[6] in the ...spi...l:													
...al:													
Bo... sexes, all causes	2,341	22.1	20.3	12.8	11.7	15.7	22.5	18.7	19.3	26.7	32.5	33.3	39.7
M..., all causes	890	21.7	18.5	10.4	12.9	17.0	21.4	25.7	18.6	20.8	27.9	33.3	42.4
Fe...ale, all causes	1,447	22.7	21.4	15.9	10.5	14.7	23.2	17.0	19.5	29.7	35.6	33.3	37.1
Fe...ale, all except genital and puerperal	956	24.6	22.2	15.9	10.5	14.7	25.4	28.8	21.3	31.1	35.1	32.1	39.4
...gic...													
Bo... sexes, all causes	1,452	26.8	23.7	11.8	11.3	17.9	25.6	30.1	26.4	32.9	38.6	48.6	47.4
M..., all causes	618	22.5	19.1	10.8	11.8	18.6	16.7	30.8	19.7	23.7	32.4	47.4	46.7
Fe...ale, all causes	834	29.9	27.1	13.3	10.8	17.3	31.5	29.8	29.2	38.0	43.1	50.0	47.8
Fe...ale, all except genital and puerperal	686	29.8	26.2	13.3	10.8	17.3	32.7	35.7	29.1	40.0	41.9	50.0	52.4
N...su...ical[3] except institutional:													
Both sexes, all causes	816	15.7	15.3	15.1	15.3	6.9	17.1	8.0	13.6	18.8	25.0	8.0	30.1
Male, all causes	240	21.8	18.3	10.0	20.7	11.1	31.3	11.1	19.2	17.9	19.0	14.3	50.0
Female, all causes	572	13.8	14.0	21.9	10.0	----	8.0	7.6	13.0	19.2	28.6	----	22.2
Female, all except genital and puerperal	229	13.2	12.7	21.9	10.0	----	6.3	8.3	4.5	12.5	30.0	----	22.2
...of hospital days that were hospital nursing ...[6]													
...al:													
Both sexes, all causes	31,035	13.5	12.6	5.4	7.7	5.5	14.4	15.2	11.3	18.5	17.3	15.7	15.5
Male, all causes	13,112	11.5	10.3	4.3	11.4	6.4	10.7	31.5	6.0	12.8	13.1	11.6	12.6
Female, all causes	17,631	15.4	14.4	8.1	3.8	4.9	19.6	10.7	13.2	21.7	20.3	24.7	21.1
Female, all except genital and puerperal	11,668	15.3	13.6	8.1	3.8	4.9	22.2	15.6	11.6	18.6	20.6	21.7	22.0
...gical:													
Both sexes, all causes	12,972	22.6	21.5	10.3	16.4	12.0	24.8	23.0	18.3	27.0	25.7	30.4	23.8
Male, all ca...	5,679	19.1	17.2	8.9	21.1	8.7	17.8	34.9	12.9	17.2	18.3	20.9	22.9

Female, all causes	7,293	25.9	24.9	15 0	10.3	17.3	28.6	15.5	20.6	32.5	30.2	46.2	24.5
Female, all except genital and puerperal	5,399	26.0	24.5	15.0	10.3	17.3	29.3	19.6	20.4	30.3	31.6	43.2	25.9
Nonsurgical [3] except institutional:													
Both sexes, all causes	12,367	9.3	8.5	4 0	3.0	.5	24.1	9.1	10.4	12.8	7.1	4.9	12.6
Male, all causes	4,637	8.3	6.9	2.5	5.9	.9	31.2	15.9	2.9	12.2	1.5	8.3	12.0
Female, all causes	7,438	9.9	9.7	5.9	.6	----------	17.8	8.5	11.8	13.0	13.0	----------	15.2
Female, all except genital and puerperal	3,369	8.4	7.3	5.9	.6	----------	27.4	15.0	9.5	8.4	14.9	----------	15.2
Hospital nursing days [6] per hospital case [5] with a special nurse:													
Total:													
Both sexes, all causes	475	8.8	8.3	4.5	5.3	4.6	9.3	10.3	7.7	10.1	9.1	10.1	11.0
Male, all causes	165	9.1	8.2	4.7	7 0	4.6	10.2	16.8	5.6	9.5	8.2	9.4	11.4
Female, all causes	309	8.7	8.2	3.5	3.0	4 6	8.7	7.8	8.2	10.4	9.6	11.0	10.5
Female, all except genital and puerperal	212	8.1	7.5	3.5	3.0	4.6	9.1	6.9	7.0	9.4	10.0	10.0	10.5
Surgical:													
Both sexes, all causes	344	8.8	8.1	3.5	5.5	4.8	6.9	9.3	6.9	10.5	10.4	10.6	12.7
Male, all causes	118	9 5	8.3	4 2	7.4	5.1	6.7	17.1	6.5	9.2	7.8	9.1	15.1
Female, all causes	226	8.6	8.0	2.6	3.3	4.6	7.0	5.6	7.0	10.9	11.7	12.1	11.1
Female, all except genital and puerperal	180	8.1	7.3	2.6	3.3	4.6	7.0	5.7	6.3	9.3	12.3	11.1	11.1
Nonsurgical [3] except institutional:													
Both sexes, all causes	125	8.7	8.4	6.2	4 3	1.5	17.1	13.6	9.4	9.2	3 9	9.5	7.6
Male, all causes	44	7 6	7.3	6.0	5.8	1.5	14 6	14.0	3.0	10.3	1.5	9.5	7.6
Female, all causes	80	9 1	9 0	4.7	1 3	----------	23.5	13.5	10 4	8.8	4.8	----------	7.5
Female, all except genital and puerperal	29	8.8	8.5	4 7	1 3	----------	45.0	21.0	20.5	10.0	5.2	----------	7.5

[1] All ages includes a few of unknown age; both sexes includes a few of unknown sex.

[2] Rates in the form of cases or days per 1,000 population are adjusted by the direct method to the age distribution of the white population of the death registration States in 1930 as a standard population; this population is given for specific ages in table 1 of a preceding paper (4).

Figures in the "adjusted" column on days per case represent the result of dividing the adjusted rate for days per 1,000 by the adjusted rate for cases per 1,000; figures in the "adjusted" column for percentages of cases or percentage of days represent the percentage that one adjusted rate per 1,000 is of another adjusted rate per 1,000.

[3] Hospital cases represent periods of illness spent in a hospital regardless of the numbers of diagnoses; that is, these totals for all causes are the sums of data for cases with sole or primary diagnoses. They include cases in all types of hospitals for 1 night or longer, except the few cases in hospitals throughout the study year (16 cases). All other nonsurgical cases in mental and tuberculosis hospitals and other sanatoriums (73 cases) as well as the 16 cases mentioned above, are excluded from the nonsurgical cases; 2 short surgical cases in hospitals of this type were included as negligible. Thus total cases, which means surgical plus nonsurgical, includes 73 institutional cases not included in either subgroup.

Hospital cases include those admitted prior to but receiving hospital inpatient service within the study year and cases still in the hospital at the end of the year of observation; hospital days include only those within the study year. In computing total hospital days, hospital cases with an unknown number of days were put in at an average based on cases of the same diagnosis group with known hospital days, exclusive of the few cases in a hospital throughout the study year.

Illness from accident is included along with that due to disease. Infants born in a hospital are not counted as cases unless they were sick.

[4] Total cases include those with symptoms lasting 1 day or longer and sick days include both disabling and nondisabling days; disabling cases refer to those causing inability to work, attend school, care for the home, or pursue other usual activities for 1 day or longer regardless of age or employment status; bed cases refer to those confining the patient to bed or hospital for 1 day or longer; for further details and rates per 1,000 see table 1 of a preceding paper (14).

[5] Hospital cases with a nurse include all that had one or more private duty nurses for 1 or more days or nights or both; nursing provided as a part of the hospital service is not included here.

[6] A day with two or more private nurses within the 24 hours is counted as only 1 nursing day to put nursing and hospital days on the same basis; nursing provided as a part of the hospital service is not included here.

[7] Rates plotted in figs. 1 and 8 as 15-24: hospital days per case, all cases, male 17.9, female 11.7, female except 11.5; percent of all hospital cases with special nurse, male 23.1, female 19.3, female except 26.9; percent of all hospital days that were hospital nursing days, male 16.8, female 13.6, female except 18.9; hospital days per 1,000 males, surgical 255, nonsurgical 133; hospital days per case for males, surgical 10.0, nonsurgical 12.9.

The percentage of disabling and bed cases that were hospitalized show two types of differences between the sexes, (a) a higher percentage of all disabling and bed cases are hospitalized among females of the childbearing ages, but this is not true of diagnoses common to

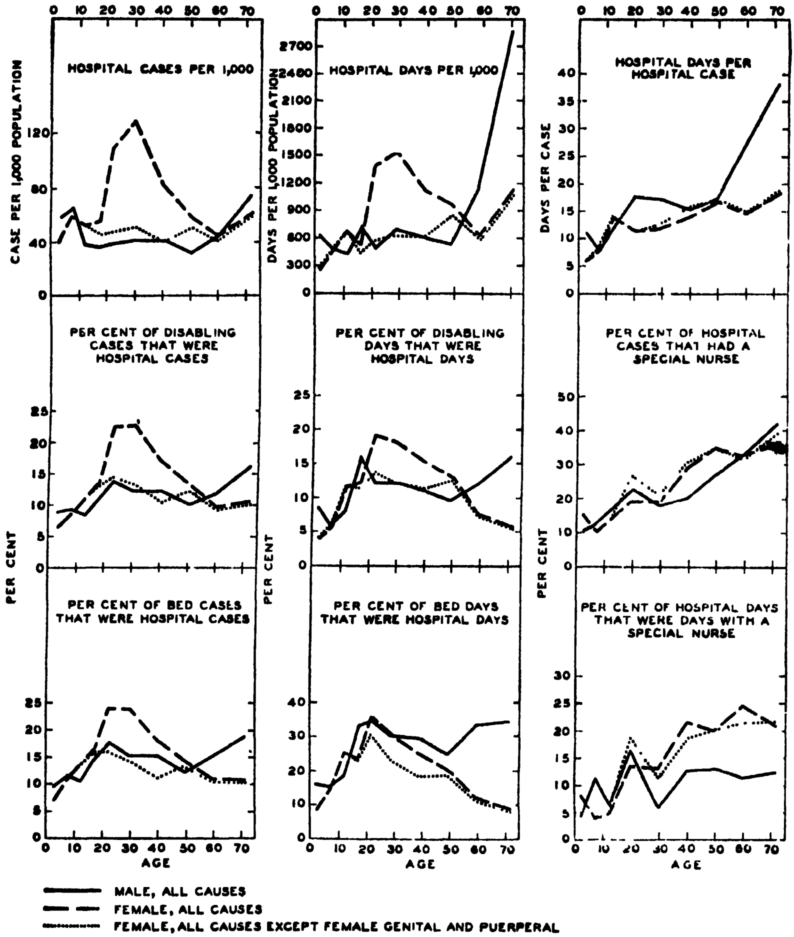

FIGURE 1.—Annual volume of hospital care for illness from all causes as measured by various types of rates for males and females of specific ages—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Includes all except cases in hospital throughout year. Scales are so made that the adjusted rate for all ages of both sexes represents an interval on the vertical rate scale that corresponds to approximately 30 years on the horizontal age scale.)

the two sexes, (b) in the ages above 55 years males show a higher percentage of cases hospitalized; this difference between the sexes is more marked in the percentage of the days in bed that were spent in a hospital.

Hospital cases represent a selection of the severe illnesses in the community; this situation is emphasized by the fact that 22 percent

of the hospitalized illnesses had the exclusive services for one or more of the days or nights in the hospital of a special private-duty nurse, presumably paid by the patient. Of the total hospital days, 14 percent were days with a special nurse for one or more of the two or three nursing shifts of the 24-hour hospital day. Of the hospital cases with a special private duty nurse, 65 percent had one such nurse during some part of at least one 24-hour hospital day, and 35 percent had two or more special nurses during at least one 24-hour day. The percentage of cases with a special nurse in the hospital increases with age, but there are no large differences between the sexes; however, the percentage of hospital days with a special nurse is greater for adult females than males (fig. 1).

TABLE 2.—*Hospital admissions per 1,000 population and the percentage of cases hospitalized among single and married males and females of specific ages—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

Age and marital status	All causes [1]			Female, except genital and puerperal	All causes [1]			Female, except genital and puerperal
	Both sexes	Male	Female		Both sexes	Male	Female	
	Hospital cases per 1,000 population during year				Number of hospital cases			
Total 20–34:								
Single	53.0	48.4	62.9	56.2	96	40	56	50
Married	101.6	41.0	142.4	47.9	596	97	499	168
20–24:								
Single	51.2	45.5	57.8	56.0	63	30	33	32
Married	129.3	21.5	168.5	42.1	113	5	108	27
25–29:								
Single	52.2	34.7	68.1	57.6	19	6	13	11
Married	105.1	39.9	147.5	43.9	221	33	188	56
30–34:								
Single	64.2	44.4	78.1	54.7	11	4	10	7
Married	90.6	45.3	127.8	53.5	262	59	203	85
	Percent of total cases that were hospitalized				Population (years of life)			
Total 20–34:								
Single	9.9	9.7	10.1	9.2	1,812	922	890	
Married	11.9	6.7	14.0	6.4	5,869	2,361	3,505	
20–24:								
Single	9.9	10.4	9.6	9.6	1,230	659	571	
Married	14.5	4.3	16.3	6.4	874	233	641	
25–29:								
Single	10.3	7.8	12.0	10.4	364	173	191	
Married	12.3	6.7	14.5	6.0	2,103	828	1,275	
30–34:								
Single	9.2	8.3	9.6	6.9	218	90	128	
Married	10.7	7.0	12.6	6.8	2,892	1,303	1,589	

[1] Exclusive of a few cases in a hospital throughout the study year.

Table 2 shows by sex and marital status hospital admission rates and the percentage of cases hospitalized among persons 20 to 34 years of age. Among males there are no consistent differences between admission rates for the married and the single. Among females the admission rates for all causes and the percentage of cases hospitalized are consistently higher for the married, but when female genital and puerperal diagnoses are excluded the rates and percentages are rather consistently lower for the married than the single. Admission rates

for all causes and also for all except female genital and puerperal diagnoses are rather consistently higher for females than for males of like marital status, but this is not true of the percentage of cases hospitalized.

TABLE 3.—*Percentage of hospital admissions and days due to certain diagnoses—all causes except mental and nervous diseases and tuberculosis in, 4 studies*[1] *of hospital morbidity*

[Sole or primary diagnoses except in New York study [2]]

Diagnosis	Percentage of hospital cases due to each diagnosis				Percentage of hospital days due to each diagnosis		Hospital days per hospital case	
	Canvassed white families, 1928–31	Ontario public general hospitals, 1936	Baltimore, 1926–35	New York City, 1933	Canvassed white families, 1928–31	Ontario public general hospitals, 1936	Canvassed white families, 1928–31	Ontario public general hospitals, 1936
All causes except mental and nervous and tuberculosis	100	100	100	100	100	100	11.4	13.5
Tonsil and adenoid diseases	28.0	13.3	24.9	10.3	4.6	1.8	1.9	1.8
Deliveries and abortions	16.3	16.1	18.1	11.0	16.6	13.4	11.7	11.2
Accidental injuries	9.0	11.4	6.9	8.6	11.2	12.0	14.3	14.3
Appendicitis	8.4	8.0	4.5	4.3	10.1	7.8	13.8	13.2
Degenerative diseases [3]	5.3	10.6	5.6	12.8	13.2	20.4	28.5	26.1
Female genital diseases and complications of pregnancy	3.6	3.8	3.9	2.8	4.4	3.8	13.7	13.6
Communicable diseases [4]	2.6	0.9	3.8	2.6	4.2	1.5	18.5	21.7
Nonmalignant tumors, including female genital	2.0	2.6	3.0	3.2	2.4	2.8	13.6	14.8
Mastoid diseases	2.0	1.0	1.1	1.7	1.4	1.0	8.2	14.3
Diseases of bones, joints, malformations and early infancy	[5] 1.9	2.0	2.6	1.9	[5] 5.1	3.5	[5] 31.4	23.5
Hernia	1.9	1.6	2.5	2.2	2.7	2.2	16.8	18.3
Pneumonia	1.6	2.1	3.5	3.1	2.2	2.3	15.8	15.0
Biliary calculi and cholecystitis	1.6	1.3	1.2	1.2	2.5	1.8	18.1	18.2
All other causes	15.8	25.3	18.4	34.3	19.4	25.7	13.9	13.8
Number of cases, all causes	2,250	52,579	2,497	615,693	25,762	712,083	2,250	52,579

[1] Present study of 8,758 canvassed families; Ontario, Canada, last quarter of 1936 (*31*); samples from nine Baltimore hospitals, 1926–35 (*22*), New York City Welfare Council Study, calendar year 1933 (*21*).
[2] Data for New York City study are available only as totals including contributory
[3] Degenerative includes diseases of the heart, kidney (except pyelitis), diabetes, cancer, arteriosclerosis, high blood pressure, cerebral hemorrhage, varicose veins, cystitis, urinary calculi, and other bladder diseases.
[4] Communicable includes the common contagious diseases of childhood and other infections such as meningitis, poliomyelitis, typhoid, erysipelas, dysentery, but excludes influenza, tuberculosis, venereal disease, and septicemia.
[5] Two cases in the hospital throughout the study year are excluded from this diagnosis and from all causes; the other 14 year-long cases were excluded as mental and tuberculosis cases.

Important diagnoses in hospitalized illness.—Before considering diagnosis in this relatively small sample of hospitalized illnesses in the surveyed group, some comparison should be made with diagnosis distributions in other hospital data. Table 3 shows the percentage of hospital cases, exclusive of all mental and nervous diseases and tuberculosis, that were due to certain diagnoses that are important in hospital practice and which were available in the four studies included in the table. The 13 diagnoses account for three-fourths or more of the cases in three studies but only two-thirds of those in New York. All of the data refer to sole or primary diagnoses except for New York, which were available only as a total of sole, primary, and contributory diagnoses. Tonsil and adenoid diseases (largely tonsillectomy)

is a major cause of hospitalization in all four groups, but is considerably more important in the present family survey and the Baltimore study than in New York and Ontario. Deliveries, abortions, and stillbirths constituted 16 to 18 percent of the hospital cases in three studies, but only 11 percent in New York. Appendicitis constituted about 8 percent of all cases in Ontario and in the family study, but only 4 to 5 percent in the Baltimore and New York studies. An examination of other causes indicates considerable variation from one group to another in the percentage of cases due to a specific diagnosis;

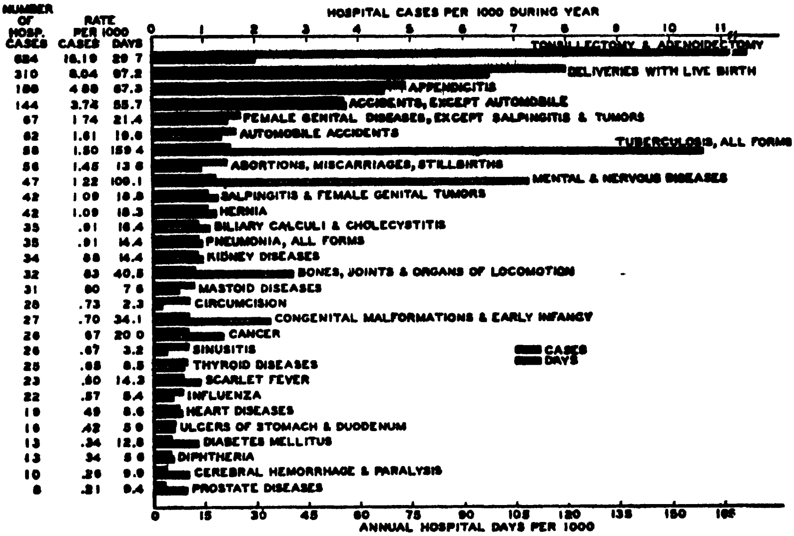

FIGURE 2.—Annual frequency of hospital admissions and days of hospital care for certain diseases per 1,000 population—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Sole or primary diagnoses for all specific causes with 15 or more hospital cases or 200 or more hospital days. Rates per 1,000 exclusive of institutional were: Tuberculosis 0.49 cases, 13.5 days; mental and nervous diseases 0.54 cases, 11.0 days; diseases of bones, joints, and organs of locomotion 0.78 cases, 29.4 days; congenital malformations and early infancy 0.67 cases, 24.7 days.)

however, all four studies are in agreement in that the major causes of hospitalization are tonsil and adenoid diseases, deliveries, accidents, appendicitis, female genital diseases, and degenerative diseases. The two studies for which days of hospital care are available indicate that the same causes are also important in days of hospital care, with the possible exception of tonsil and adenoid diseases and the possible addition of diseases of the bones, joints, and organs of locomotion.

Figure 2 shows admission rates and annual hospital days for important specific diagnoses [19] for the 8,758 canvassed families of this

[19] It should be noted that throughout this paper the rates for detailed causes of illness are crude rates because the numbers of cases are insufficient for age adjustment. However, rates for the five major causes have been adjusted for age and are given in table 6 and its footnotes. Since the canvassed sample has relatively more children and fewer older persons than the general population, the effect of adjustment is to reduce considerably the rate for tonsillectomy, ear diseases, and communicable diseases, and increase that for degenerative diseases of old age. Other diagnoses which vary less with age are not greatly affected.

study. The data pertain only to sole or primary causes to avoid counting the same hospital day on two cases.[20]

By far the most frequent cause of hospital admission was tonsillectomy, with deliveries second. When all accidents are counted as a single cause they are third and appendicitis fourth, but in this chart automobile and other accidents are separated; automobile accidents constitute 30 percent of the total accident admissions. Other diagnoses with considerable frequencies are the various categories of female genital diseases and abortions. In terms of admissions to all types of

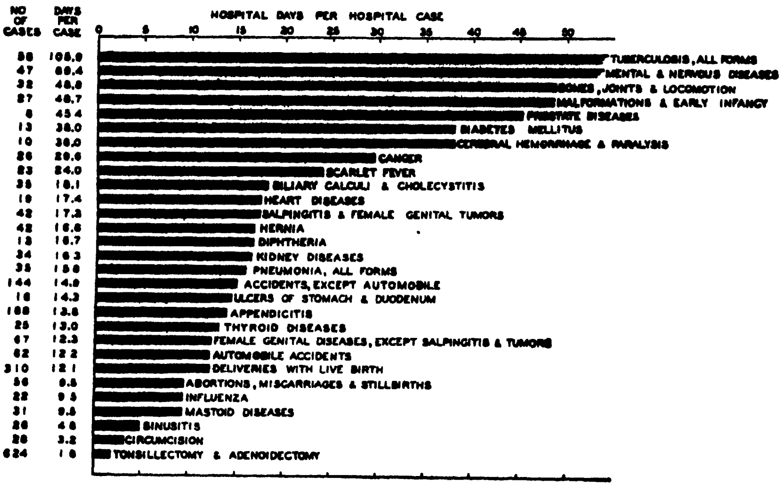

FIGURE 3.—Hospital days per hospital case of certain diseases—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Sole or primary diagnoses for all specific causes with 15 or more hospital cases or 200 or more hospital days. Hospital days per case exclusive of institutional were Tuberculosis, 27.3; mental and nervous diseases, 20.1; diseases of bones, joints, and organs of locomotion, 37.8; malformations and early infancy, 36.6.)

hospitals, tuberculosis was seventh among the diagnoses listed in this chart; but in days of hospital care it was the first cause, although complete enumerations of all cases in mental institutions would no doubt put mental diseases above it.[21] However, when data for tuberculosis hospitals are excluded, neither tuberculosis cases nor days are large for the remaining general and special hospitals. The same is true of mental cases in nonmental hospitals. Other diagnoses in their order of importance in terms of days of hospital care per

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[20] Of the 2,357 admissions, 2,093 had only one diagnosis, and 264, or 11 percent of the total, had two or more diagnoses; there were 304 contributory diagnoses on the 264 cases with two or more diagnoses.

[21] Hospital cases and days for mental diseases as recorded in this family study were incomplete as compared with data from the American Medical Association (27). However, the recorded admissions to and days of care in tuberculosis hospitals compare favorably with the American Medical Association data. Admissions to tuberculosis hospitals in this study constituted 1.8 percent of all admissions to all except mental hospitals, as compared with 1.3 for the American Medical Association data. Days of care in tuberculosis hospitals constituted 17.9 percent of all days in all except mental hospitals in this study and 15.8 percent in the American Medical Association data. However, the total number of hospitalized tuberculosis cases in the present study is too small to give much reliability to the rates.

1,000 population are deliveries, all accidents, appendicitis, diseases of the bones, joints, and organs of locomotion, and malformations and diseases of early infancy.[22]

In terms of hospital days per case (fig. 3), the diagnoses that head the list are severe diseases which are not so frequent as causes of admission, namely, tuberculosis, mental diseases, bone and joint diseases, and malformations and diseases of early infancy. Tonsillectomy, although first in frequency, had the shortest duration, 1.8 days per case; deliveries, appendicitis, and accidents which were high in both frequency and hospital days per 1,000 population have reasonably short average durations in the hospital.

Hospital admission rates for males and females are shown for specific diagnoses in figure 4. The diseases that stand out as having definitely

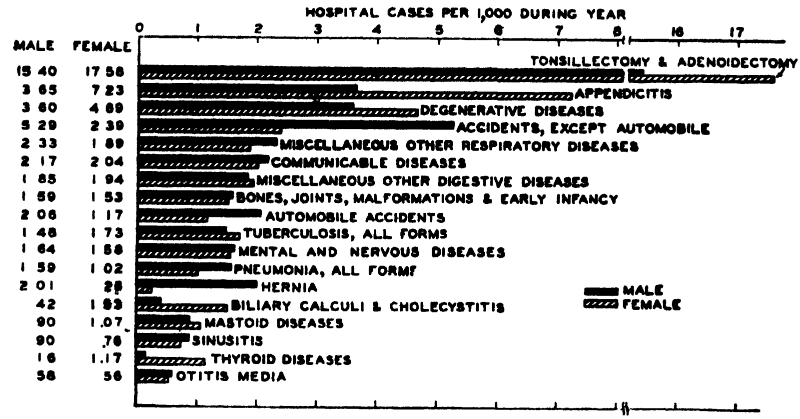

FIGURE 4.—Annual frequency of hospital admissions for certain causes per 1,000 males and females—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Sole, primary, and contributory diagnoses for all cases The heterogeneous group of diseases of the bones and joints, malformations and early infancy used in various parts of this paper all tend to have long hospital durations.)

higher admission rates for males are accidents, both automobile and other; hernia, and pneumonia. The diseases that stand out as having definitely higher rates for females are appendicitis, biliary calculi and cholecystitis, thyroid diseases, degenerative diseases, and tonsillectomy. The variations between males and females in admission rates generally reflect sex differences in the total incidence of the several diseases.

Diagnosis distribution of the hospital case load.—The make-up of the hospital case load in terms of different diagnoses is of interest; similarly, the total days of hospital care can be distributed according to the diagnoses primarily responsible for the hospitalization. Because institutional cases were underreported in this survey, data for mental

[22] In this study made primarily from the point of view of illness in the canvassed family, infants born in a hospital were not counted as hospital admissions (illness) unless there was some disease or condition which required treatment.

hospitals are excluded; as already noted, data for tuberculosis hospitals seem to be more complete and are used in some instances.

Figure 5 shows in the first two bars on the left the diagnosis distribution of hospital cases and days for all except mental hospitals. In terms of cases, tonsillectomy constitutes 27 percent of the total,

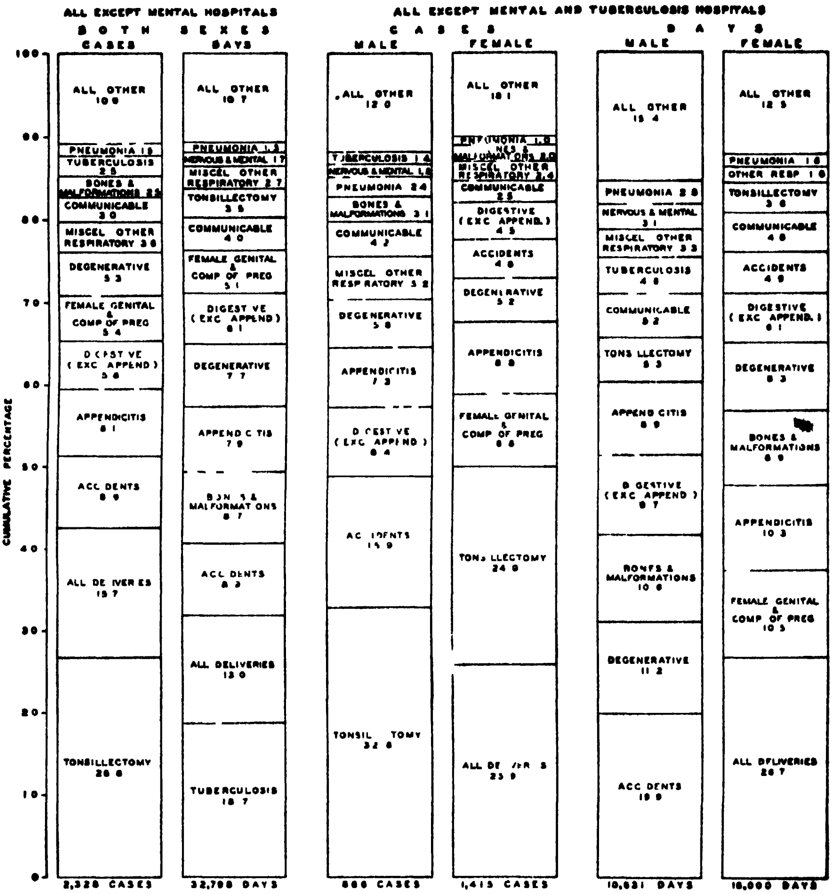

FIGURE 5.—Percentage of cases and days of hospital care (exclusive of certain institutions) which were due to each diagnosis, by sex—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Sole or primary diagnoses, each bar shows the 14 diagnoses of the second (days) bar except where less than 1.0 percent.)

deliveries and abortions 16 percent, accidents 9 percent, and appendicitis 8 percent; thus these four diagnoses constitute 60 percent of the hospital case load. However, the average stay in the hospital for the various diagnoses differs greatly, so the distribution with respect to days of hospital care is quite different. Tuberculosis, which accounts for about 2 percent of the hospital cases, is responsible for 19 percent of the days of hospital care. In terms of hospital days, deliveries

and abortions come second, 13 percent; accidents third, 9 percent; bones, joints, malformations and diseases of early infancy fourth, 9 percent; and appendicitis fifth with 8 percent of the total days of hospital care, exclusive of that in mental hospitals.

The two middle bars in figure 5 compare for males and females the diagnosis distribution of hospital cases except those in mental and tuberculosis hospitals. For males the most important diagnoses are tonsillectomy which constitutes 33 percent of the total cases; accidents, 16 percent; digestive diseases except appendicitis, 8 percent; and appendicitis, 7 percent. For females, however, deliveries and abortions come first with 26 percent of the cases; tonsillectomy second, 24 percent; female genital diseases third, 9 percent; and appendicitis fourth, 9 percent. Accidents, which is second among males with 16 percent of the cases, is sixth among females with 5 percent of the cases.

The two bars on the right of figure 5 make a similar comparison of males and females with respect to days of hospital care, except in mental and tuberculosis hospitals. Among males accidents come first, causing 20 percent of the total days of hospital care, and degenerative diseases are second with 11 percent. Among females deliveries and abortions are the first cause in days of hospital care, being responsible for 27 percent of the total, and female genital diseases second, with 11 percent. Among males, tonsillectomy was first in terms of cases (33 percent), but sixth in terms of days (5 percent); among females it was second (24 percent) in terms of cases but ninth (4 percent) in terms of days.

Proportions of specific diagnoses hospitalized.—Of interest also is the percentage of cases of certain diagnoses occurring in the community which receive hospitalization; this family study of all illness affords data for such percentages. It has been seen that 7.5 percent of all cases and 12.5 percent of disabling cases (causing inability to work or pursue other usual activities for one day or longer) were hospitalized. Figure 6 shows for a long list of specific diagnoses the percentage of the total cases that were hospitalized. Although not shown in graphic form, there is, at the left of the chart, the percentage of disabling cases that were hospitalized and the percentage of all cases that were attended by a doctor.

Of all tonsillectomies, 76 percent were hospital cases, the other 24 percent being done at a clinic, doctor's office, or at home. Other diagnoses for which 50 percent or more of all the cases were hospitalized are mastoid diseases, 73 percent; tumors of the female genital organs, 67; appendicitis, 60; salpingitis and pelvic abscess, 59; and cancer, 50 percent. It should be noted that these percentages are based on total cases, but every diagnosis with 8 percent or more of the cases in a hospital shows an attendance by a doctor of 87 percent or more (only two are below 90 percent); therefore, the per-

centages of attended cases that were hospitalized would not differ greatly from the percentages based on total cases.[22]

Considering all illness, 6.4 percent of the cases among males were hospitalized, as compared with 8.1 among females for all causes and

NUMBER OF ALL CASES	PER CENT ATTENDED BY DOCTOR	PER CENT IN HOSPITAL: DISAB CASES	PER CENT IN HOSPITAL: ALL CASES	
841	100.0	77.3	75.6	TONSILLECTOMY & ADENOIDECTOMY
52	100.0	79.2	73.1	MASTOID DISEASES
46	100.0	81.6	67.4	TUMORS, FEMALE GENITAL
352	97.7	67.4	59.9	APPENDICITIS
32	100.0	70.4	59.4	SALPINGITIS & PELVIC ABSCESS
52	98.1	66.7	50.0	CANCER
96	89.6	71.7	44.8	HERNIA
63	100.0	55.3	41.3	COMPLICATIONS OF PREGNANCY & CHILDBIRTH
105	97.1	55.1	41.0	RESPIRATORY TUBERCULOSIS
761	99.6	40.7	40.7	DELIVERIES WITH LIVE BIRTH
30	93.3	50.0	40.0	NON-RESPIRATORY TUBERCULOSIS
95	100.0	50.7	40.0	CIRCUMCISION
149	97.3	38.5	38.3	ABORTIONS, MISCARRIAGES & STILLBIRTHS
84	100.0	57.7	35.7	CONGENITAL MALFORMATIONS & EARLY INFANCY
191	95.3	40.0	32.5	AUTOMOBILE ACCIDENTS
141	88.7	49.4	29.1	MISCELLANEOUS OTHER NERVOUS DISEASES
31	100.0	50.0	29.0	PROSTATE DISEASES
322	94.7	55.3	25.8	MISCELLANEOUS OTHER FEMALE GENITAL DISEASES
76	97.4	34.0	21.1	ULCERS OF STOMACH & DUODENUM
72	93.1	42.9	20.8	DIABETES MELLITUS
185	94.1	29.0	20.5	BILIARY CALCULI & CHOLECYSTITIS
136	91.2	63.4	19.1	THYROID DISEASES
70	100.0	18.6	18.6	DIPHTHERIA
127	99.2	47.9	18.1	TUMORS, EXCEPT FEMALE GENITAL
65	90.8	20.8	16.9	CEREBRAL HEMORRHAGE & PARALYSIS
316	99.7	15.8	15.8	PNEUMONIA, ALL FORMS
38	100.0	25.0	15.8	PUERPERAL DISEASES OF BREAST
47	97.9	33.3	14.9	SUSPECTED TUBERCULOSIS
82	95.1	34.3	14.6	DISEASES OF BONES & JOINTS
111	87.4	36.6	13.5	HEMORRHOIDS
127	98.9	24.6	13.4	ABSCESSES & ULCERS
183	94.5	39.7	12.6	DIS. OF ORGANS OF LOCOMOTION, EXCEPT BONES & JOINTS
230	93.5	11.6	11.3	SCARLET FEVER
176	96.6	36.5	10.8	EYE DISEASES, EXCEPT STY & CONJUNCTIVITIS
93	98.9	16.4	10.8	PYELITIS
114	92.1	11.5	10.5	PLEURISY
118	100.0	15.2	10.2	NEURASTHENIA & NERVOUS BREAKDOWN
158	98.1	15.9	8.9	CYSTITIS & CALCULI OF URINARY PASSAGES
395	95.7	16.2	8.1	SINUSITIS
336	93.2	12.0	8.0	HEART DISEASES
38	89.5	9.1	7.9	ACUTE RHEUMATISM
51	92.2	23.5	7.8	VARICOSE VEINS OR ULCER
80	98.7	10.2	7.5	NEPHRITIS, ACUTE & CHRONIC
172	93.1	14.6	7.0	CHRONIC RHEUMATISM & ARTHRITIS
146	94.5	19.6	6.8	ANEMIA, ALL FORMS
165	99.5	12.8	6.5	ARTERIOSCLEROSIS & HIGH BLOOD PRESSURE
48	91.7	8.1	6.3	CONVULSIONS
1875	90.6	12.8	6.1	MISCELLANEOUS OTHER INJURIES
197	90.9	11.6	5.6	INJURY BY FALL
184	89.7	10.5	5.4	KIDNEY DISEASES, EXCEPT NEPHRITIS & PYELITIS
232	85.3	8.2	5.2	LYMPHATIC GLAND DISEASES
233	91.0	6.6	5.2	LOCAL & OTHER INFECTIONS NOT FROM ACCIDENT
118	97.5	15.8	5.1	EYE INJURY
129	82.2	5.6	4.7	MALARIA
293	86.0	11.7	4.4	INJURY BY CUTTING OR PIERCING
231	87.4	8.1	4.3	MENSTRUAL DISORDERS
918	96.9	6.9	4.2	OTITIS MEDIA
190	82.0	6.9	4.0	ASTHMA

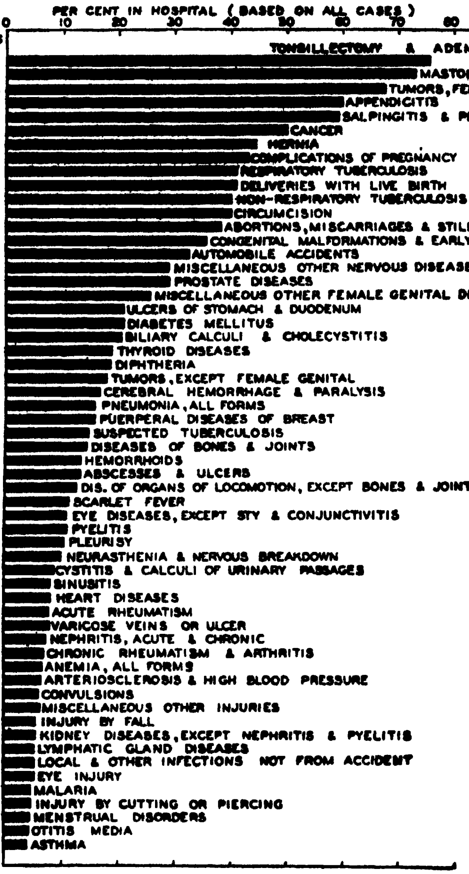

FIGURE 6.—Percentage of cases of certain diagnoses that were hospitalized—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Sole, primary, and contributory diagnoses for all specific causes with 30 or more total cases and with 4 percent or more of the cases hospitalized.)

5.8 percent for all except female genital and puerperal diagnoses. Thus for diagnoses common to the two sexes, males were hospitalized in a slightly higher percentage of illnesses than females.

Figure 7 shows for males and females separately the percentage of all cases of specific diagnoses that were in a hospital. Diagnoses

[22] Of the deliveries with live birth in this study, 40.7 percent were in hospitals, as compared with 36.9 percent for the total United States in 1935 (33), the first year with available data. Figures of this kind for all births (live and still) are available for Ontario, Canada (public general hospitals) back to 1900; in that year 1.[illegible] percent of all births were in hospitals; the percentage in 1910 was 5.0; and in 1920 16.4. In 1930, 34.9 percent of the live births took place in hospitals; in 1935 the figure was 40.1, and in 1938, 47.5 percent (31).

not common to the two sexes are excluded, as are also those with less than 25 total cases for either sex. Of the 38 diagnoses included, 26 show a higher percentage of cases hospitalized among males and 12 diagnoses show a higher percentage hospitalized among females. While the differences are negligible in some cases, they are usually fairly large; among the diagnoses with the larger differences and with higher percentages for males are malformations and diseases of

Number of cases M	Number of cases F	Per cent in hosp M	Per cent in hosp F	
403	438	72.2	78.8	Tonsillectomy & adenoidectomy
25	27	68.0	77.8	Mastoid diseases
120	232	57.5	61.2	Appendicitis
51	84	45.1	38.1	Tuberculosis, all forms
37	42	40.5	23.8	Congenital malformations & early infancy
109	82	35.8	28.0	Automobile accidents
61	80	41.0	20.0	Miscellaneous other nervous diseases
27	45	18.5	22.2	Diabetes mellitus
30	155	26.7	19.4	Biliary calculi & cholecystitis
37	33	16.2	21.2	Diphtheria
58	69	8.6	26.1	Tumors, except female genital
37	28	18.9	14.3	Cerebral hemorrhage & paralysis
170	144	17.6	13.9	Pneumonia, all forms
35	47	14.3	14.9	Diseases of bones & joints
62	49	14.5	12.2	Hemorrhoids
62	65	17.7	9.2	Abscesses & ulcers
66	117	15.2	11.1	Diseases of organs of locomotion, except bones & joints
123	107	12.2	10.3	Scarlet fever
86	90	11.6	10.0	Eye diseases, except sty & conjunctivitis
53	61	15.1	6.6	Pleurisy
26	92	11.5	9.8	Neurasthenia & nervous breakdown
58	100	6.9	10.0	Cystitis & calculi of urinary passages
169	226	10.1	6.6	Sinusitis
124	212	11.3	6.1	Heart diseases
30	50	13.3	4.0	Nephritis, acute & chronic
70	102	4.3	6.8	Chronic rheumatism & arthritis
35	111	11.4	5.4	Anemia, all forms
49	136	14.3	3.7	Arteriosclerosis & high blood pressure
1193	682	6.6	5.3	Miscellaneous other injuries
90	107	6.7	4.7	Injury by fall
65	119	6.2	5.0	Kidney diseases, except nephritis & pyelitis
109	123	6.4	4.1	Lymphatic gland diseases
133	100	4.5	6.0	Local & other infections not from accident
77	41	5.2	4.9	Eye injury
71	58	2.8	6.9	Malaria
187	96	5.1	3.1	Injury by cutting or piercing
251	267	4.4	4.1	Otitis media
78	72	-	8.3	Asthma

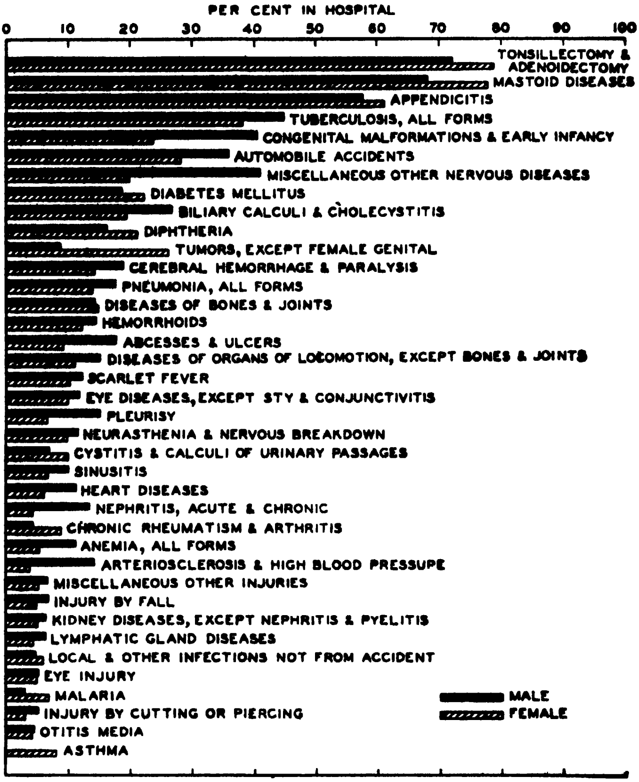

FIGURE 7.—Percentage of cases of certain diagnoses among males and females that were hospitalized—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Sole, primary, and contributory diagnoses for all specific causes with 25 or more cases for each sex and with 4 percent or more of the total cases hospitalized.)

early infancy, nervous diseases, biliary calculi and cholecystitis, abscesses and ulcers, pleurisy, heart diseases, nephritis, and arteriosclerosis. Among the diagnoses with higher percentages of cases hospitalized for females are tonsillectomy, mastoid diseases, benign tumors except female genital, chronic rheumatism and arthritis, malaria, and asthma.

Since the household informant was usually a woman, the lower percentages of cases hospitalized among females may reflect a more

complete recording of mild nonhospital cases for the female informant. However, if nondisabling cases are eliminated and the percentages based on disabling cases only, the showing is very similar to that described above; of the same 38 diagnoses, the percentages of disabling cases that were hospitalized were greater for males for 29 diagnoses—the same number as for total cases.[24] Thus whether the total or only the disabling cases be considered, males seem to be hospitalized in larger percentages of cases of specific diagnoses than is true of females.

SURGICAL AND NONSURGICAL HOSPITAL CASES

Hospital surgical cases among males amounted to 30.8 per 1,000 as compared with rates for females of 41.7 for all causes and 33.9 for all except female genital and puerperal diagnoses. The admission rate for males for nonsurgical cases (exclusive of those to mental and tuberculosis hospitals and other sanatoriums) was 13.1 per 1,000 as compared with rates for females of 30.4 for all causes, and 12.3 for all except female genital and puerperal diagnoses. In terms of hospital days there was likewise an excess for females when all causes were considered, but when diagnoses not common to the two sexes were excluded, the rates for females for both surgical and nonsurgical cases were slightly less than those for males.

Age and sex differences in surgical and nonsurgical rates.—Figure 8 shows hospital rates by sex and age for surgical and nonsurgical cases exclusive of deliveries. Throughout the chart the rates for nonsurgical cases and days are exclusive of those for mental and tuberculosis hospitals and other sanatoriums.[25]

Surgery as here used includes any cutting of tissue or suturing of wounds, and the setting of a bone or placing of a cast. The reports did not include a statement as to whether forceps were used in delivery and in some deliveries the informant may have failed to report minor

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[24] Of the 38 diagnoses, 24 showed higher percentages hospitalized for males than females for both disabling and total cases, 2 showed higher percentages for males than females for total cases and lower for disabling cases, 2 diagnoses showed lower percentages hospitalized for males than females for total cases and higher for disabling cases, the other 10 diagnoses showed lower percentages hospitalized for males than females for both disabling and total cases

For the whole United States in 1936 the percentage of deaths that occurred in hospitals (exclusive of penal institutions and those for the blind, deaf and aged) was 35 1 for males and 29 6 for females. Army, Navy, Veterans' Administration and other Federal hospitals account for about one-fourth of the excess of males over females Of 42 diagnoses common to the two sexes, 38 showed a higher percentage of deaths in hospitals and other institutions among males than females

[25] From the point of view of a family study, it would be desirable to show hospital rates regardless of the type of institution. The reasons for the exclusions are twofold (a) in a relatively small group such as the present study, it is impossible to get stability in age curves for days per 1,000 persons or days per case because the study includes so few long cases It would take a much larger study to obtain stable curves when all long cases are included. (b) Since admissions to and particularly days in mental hospitals are greatly underreported in this study, the inclusion of mental and other sanatoriums would still greatly understate the total days of hospital care for the types of illness treated in such hospitals.

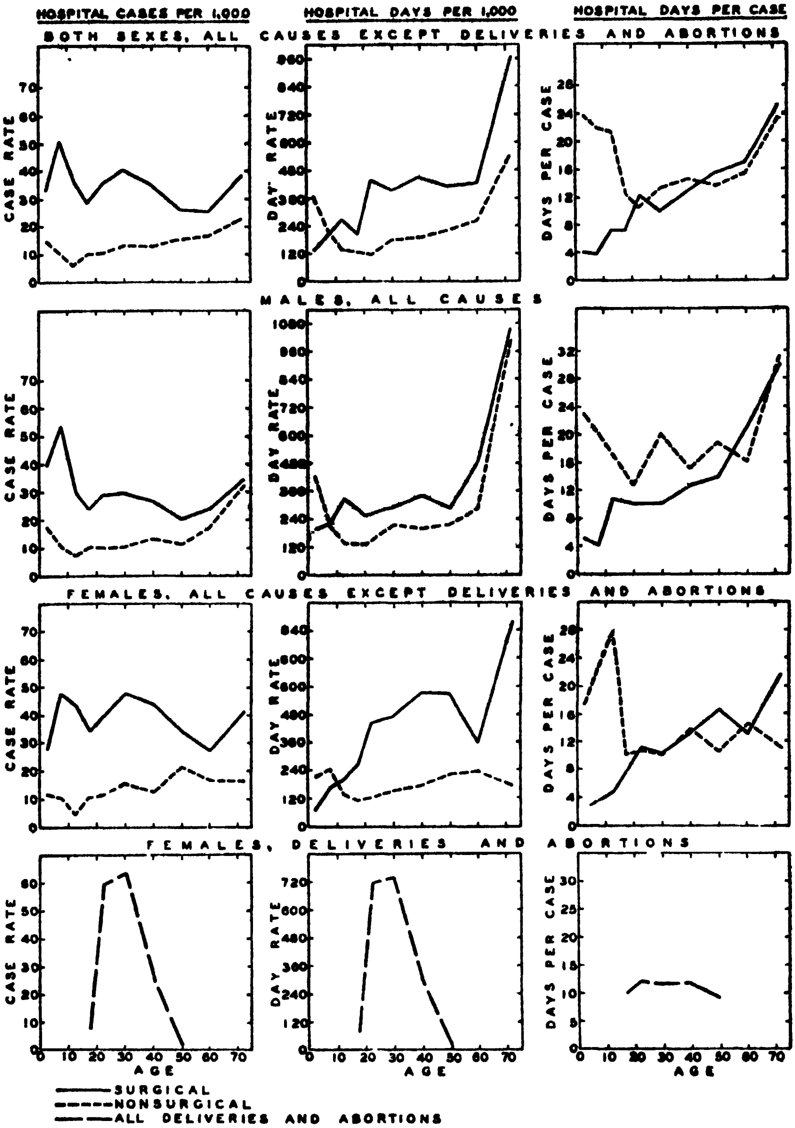


FIGURE 8.—Annual volume of hospital care for surgical, nonsurgical, and obstetrical cases among males and females of specific ages—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Sole or primary diagnoses exclusive of mental and tuberculosis hospitals and other sanatoriums and of year-long cases.)

surgery; at any rate a larger percentage of deliveries in this study were reported as nonsurgical than in studies based on hospital records.[26]

[26] Adjusted rates for deliveries (including abortions) were 19.3 per 1,000 females, of which 2.1 per 1,000 were reported as surgical and 17.2 as nonsurgical. Rates per 1,000 females of specific ages were 15–19, surgical 1.3, nonsurgical 5.9, 20–24, surgical 6.5, nonsurgical 53.1; 25–34, surgical 4.9, nonsurgical 58.4; 35–44, surgical 4.4, nonsurgical 20.7, 45–54 surgical none, nonsurgical 2.0.

In terms of hospital admissions exclusive of deliveries, surgical cases in these general and special hospitals are more frequent than nonsurgical for every age group. The largest excess for surgical cases appears at 5–9 years when tonsillectomy is frequent. However, in hospital days per 1,000 population, the ages under 10 years are higher for nonsurgical than for surgical cases; the few hospital nonsurgical cases at these ages seem to be severe. With the exception of these younger ages the days per case are not greatly different for surgical and nonsurgical cases when data for mental and tuberculosis hospitals and other sanatoriums are excluded. The hospital days per surgical case increase gradually with age from 4 days for children under 10

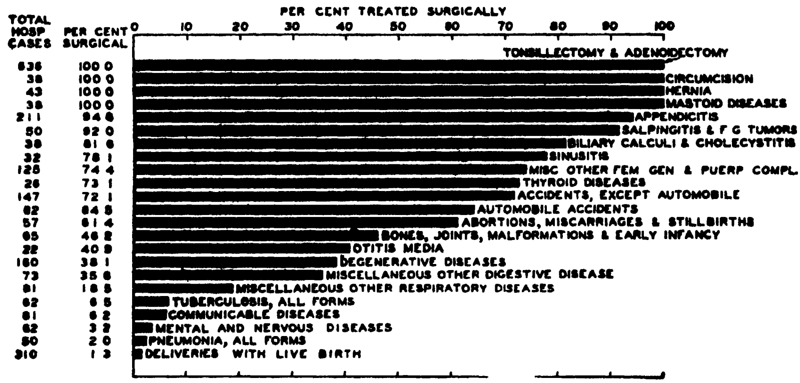


FIGURE 9—Percentage of hospital cases of certain diagnoses that were treated surgically—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Sole, primary, and contributory diagnoses for all cases.)

years to 25 days for persons over 65 years. For nonsurgical cases there is a general increase in days per case as age increases above 20 years.

Among males in hospitals, surgical cases predominate at every age but the excess over nonsurgical is small above 55 years. Among females surgical cases exclusive of deliveries also predominate at every age; when deliveries are included, surgical cases as defined in this study predominate at all ages except 20–34 years. In hospital days per 1,000 population, the rate for nonsurgical (exclusive of those in mental and tuberculosis hospitals and other sanatoriums) is lower than for surgical cases at every age group above 10 years for both males and females when deliveries are excluded. Hospital days per case among males and females fluctuate considerably from age to age, but among children of each sex nonsurgical cases have a relatively long average duration.

Proportions of hospital cases that were treated surgically.—Figure 9 shows the percentage of hospital cases of each diagnosis that were treated surgically. Of the total hospital admissions 62 percent were

treated surgically. The first two diagnoses, tonsillectomy and circumcision, are surgical by definition. The third and fourth, hernia and mastoid diseases, were also all surgical cases; although the numbers are small, 43 and 38 cases respectively, this means that in this group of families there were no hospitalized cases of these diseases which were not treated surgically. Other diagnoses with 75 percent or more of the cases treated surgically were appendicitis, 95 percent; salpingitis and female genital tumors, 92; biliary calculi and cholecystitus, 82; and sinusitis, 78 percent. Sixty-five percent of admissions because of injury in automobile accidents and 72 percent of other accident admissions were treated surgically. Toward the bottom of the list with less than 5 percent of the cases treated surgically are mental and nervous diseases, 3.2 percent; pneumonia, 2.0; and deliveries with live birth, 1.3 percent. It has already been noted that minor surgery may have been omitted in reports on deliveries; however, abortions, miscarriages, and stillbirths were reported as involving surgery in 61 percent of the admissions.

Diagnosis distribution of surgical and nonsurgical case load.—The diagnosis distribution of the surgically treated cases is quite different from the nonsurgical. Figure 10 shows the importance of the different diagnoses in the surgical and nonsurgical hospital case loads, exclusive of care in mental and tuberculosis hospitals. Tonsillectomy makes up 43 percent of the hospital surgical cases; appendicitis is second, 12 percent; accidents third, 10 percent; and female genital diseases fourth, with 8 percent of the cases. Thus, these four diagnoses make up more than 70 percent of the total hospital surgical cases. Among the hospital nonsurgical cases, deliveries and abortions constitute 39 percent; degenerative diseases, 8 percent; communicable diseases, 8 percent; and accidents 7 percent; with a total of more than 60 percent for the four diagnoses. Of these four most important nonsurgical diagnoses, only the accident group is also among the first four diagnoses for surgical cases.

In terms of hospital days, appendicitis is responsible for 20 percent of the total days of hospital care for surgical cases; accidents are second, 17 percent; digestive diseases, except appendicitis, are third, 12 percent; female genital diseases fourth, 12 percent; and tonsillectomy fifth, 9 percent. Deliveries and abortions account for 28 percent of the total days of hospital care for nonsurgical cases; bones, joints, malformations and diseases of early infancy, 15 percent; degenerative diseases, 10 percent; and communicable diseases, 9 percent.

Proportions of surgical and nonsurgical cases of specific diagnoses that were hospitalized.—Of the total surgical cases reported in the study, 60 percent were hospitalized, but of the total nonsurgical cases only 3 percent were hospitalized. Of the surgical cases that were in bed

for one or more days, 76 percent were hospitalized, as against 6 percent of such nonsurgical cases. Thus, the hospital gets practically all major surgery and a considerable share of minor surgery, but only a small proportion of the large number of nonsurgical cases.

Figure 11 shows for specific diagnoses the percentage of surgical and of nonsurgical cases that were hospitalized. More than 90 per-

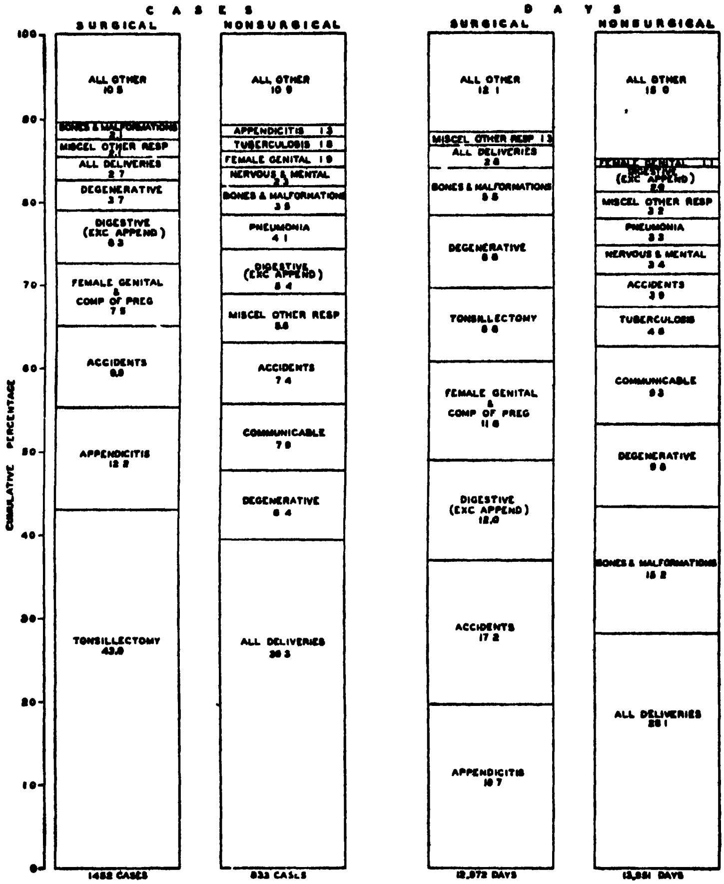
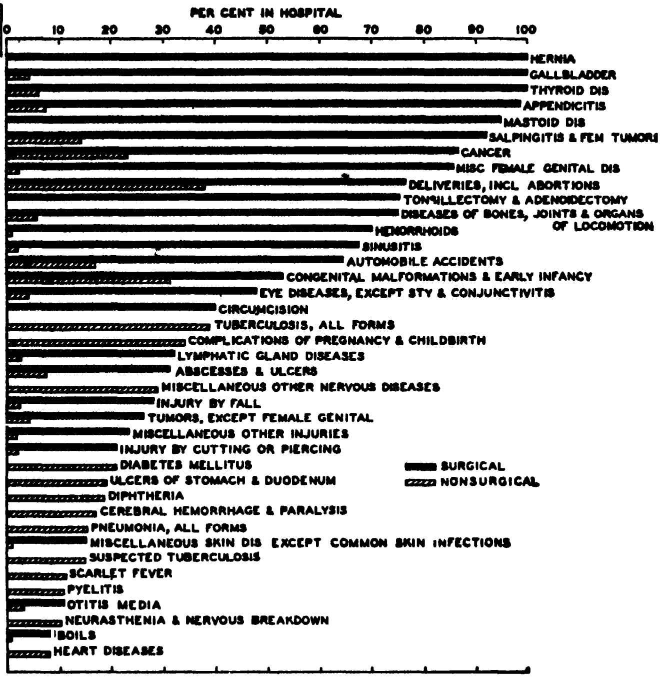


FIGURE 10.—Percentage of cases and days of hospital care for surgical and nonsurgical cases which were due to each diagnosis—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Sole or primary diagnoses for all cases except those in mental and tuberculosis hospitals; each bar shows the 14 diagnoses of the second (days) bar in fig. 5, except where less than 1.0 percent.)

cent of the surgical cases of the following diagnoses were hospitalized: hernia, gall-bladder diseases, thyroid diseases, appendicitis, mastoid diseases, and salpingitis and female genital tumors. Although these operations may seem impossible outside of a hospital, it must be remembered that these data cover some extremely rural places where an emergency operation may have been necessary. Throughout the list

of diagnoses where there were 15 or more surgical cases to use as a basis for computing the percentage, the proportion of surgical cases that were hospitalized is definitely higher than that of nonsurgical cases. Of the 23 diagnoses with 20 percent or more of the surgical cases hospitalized, all show less than 10 percent of the nonsurgical cases hospitalized except 5 diagnoses, namely, salpingitis and female genital tumors, cancer, deliveries, automobile accidents, and malformations and diseases of early infancy. There are some diseases for

Number of cases: Surg.	Number of cases: Non-surg.	Per cent in hosp: Surg.	Per cent in hosp: Non-surg.	
45	53	100.0	-	Hernia
32	153	100.0	4.6	Gallbladder
19	117	100.0	6.0	Thyroid dis
206	146	98.5	7.5	Appendicitis
40	12	95.0	*	Mastoid dis
50	28	92.0	14.3	Salpingitis & fem tumors
22	30	86.4	23.3	Cancer
91	231	85.7	2.2	Misc female genital dis
51	859	76.5	38.2	Deliveries, incl abortions
841	-	75.6	-	Tonsillectomy & adenoidectomy
28	237	75.0	5.9	Diseases of bones, joints & organs of locomotion
20	91	70.0	1.1	Hemorrhoids
37	358	67.6	2.0	Sinusitis
62	129	64.5	17.1	Automobile accidents
17	67	52.9	31.3	Congenital malformations & early infancy
27	149	48.1	4.0	Eye diseases, except sty & conjunctivitis
95	-	40.0	-	Circumcision
4	131	*	38.9	Tuberculosis, all forms
10	53	*	34.0	Complications of pregnancy & childbirth
22	210	31.8	2.4	Lymphatic gland diseases
32	95	31.3	7.4	Abscesses & ulcers
1	140	*	28.6	Miscellaneous other nervous diseases
25	172	28.0	2.3	Injury by fall
80	47	26.3	4.3	Tumors, except female genital
390	1603	23.3	1.9	Miscellaneous other injuries
38	265	21.1	2.0	Injury by cutting or piercing
-	72	-	20.8	Diabetes mellitus
3	73	*	19.2	Ulcers of stomach & duodenum
-	70	-	18.6	Diphtheria
-	65	-	16.9	Cerebral hemorrhage & paralysis
1	315	*	15.6	Pneumonia, all forms
33	278	15.2	1.0	Miscellaneous skin dis except common skin infections
-	47	-	14.9	Suspected tuberculosis
-	230	-	11.3	Scarlet fever
-	93	-	10.8	Pyelitis
85	433	10.6	3.0	Otitis media
-	118	-	10.2	Neurasthenia & nervous breakdown
34	285	8.8	7	Boils
-	336	-	8.0	Heart diseases



* LESS THAN 15 CASES AND NO PERCENTAGE COMPUTED

FIGURE 11 —Percentage of surgical and nonsurgical cases of certain diagnoses that were hospitalized—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31 (Sole, primary, and contributory diagnoses for all specific causes with 8 percent or more of surgical or nonsurgical cases hospitalized and with 15 or more total cases of either type Three appendectomies, and 1 gall bladder operation done prior to but sick outside the hospital during the study year are assumed to have been hospital cases)

which there were few or no surgical cases for the computation of a percentage. These diagnoses which are largely nonsurgical range from 39 percent hospitalized for tuberculosis to 8 percent for heart diseases; they include all diagnoses with 8 percent or more of the nonsurgical cases hospitalized.

Of the hospital surgical cases 27 percent had the exclusive services of a special private duty nurse for one or more of the days or nights in the hospital, as compared with 16 percent of the hospital nonsurgical

cases. Of the hospital surgical cases with one or more special nurses, 35 percent had two or more special nurses during at least one 24-hour day; this figure was approximately the same for nonsurgical cases, 36 percent.

(To be concluded in the next issue of PUBLIC HEALTH REPORTS.)

DEATHS DURING WEEK ENDED SEPTEMBER 5, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 5, 1942	Corresponding week, 1941
Data from 86 large cities of the United States:		
Total deaths	7,518	7,388
Average for 3 prior years	7,241	
Total deaths, first 35 weeks of year	291,722	295,266
Deaths per 1,000 population, first 35 weeks of year, annual rate	11.7	11.9
Deaths under 1 year of age	621	522
Average for 3 prior years	4,777	
Deaths under 1 year of age, first 35 weeks of year	19,647	18,186
Data from industrial insurance companies:		
Policies in force	65,002,571	64,453,029
Number of death claims	10,125	7,821
Death claims per 1,000 policies in force, annual rate	8.1	6.3
Death claims per 1,000 policies, first 35 weeks of year, annual rate	9.3	9.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED SEPTEMBER 12, 1942

Summary

The number of reported cases of poliomyelitis increased from 195 last week to 267 for the current week. This increased incidence was shared by all geographic areas except the Mountain and Pacific States. More than one-half of the cases occurred in the Middle Atlantic and East North Central States. The following named States reported the largest numbers of cases (last week's figures in parentheses): Illinois 44 (36), New York 29 (19), New Jersey 22 (21), Ohio 13 (17), Tennessee 13 (4), and Indiana 11 (7). No other State reported more than 10 cases during the current week. In only 1 year (1936) since 1930 has the peak of the incidence of poliomyelitis for the country as a whole come as late as the last week of September.

The persistence of meningococcus meningitis during the summer has brought the cumulative cases to date (2,541) above the figure for the corresponding period of any other year since 1937 (4,336). For the current week the number of reported cases (46) was above that for the corresponding week in 1937 (44). The highest incidence continues in the Middle Atlantic and South Atlantic States.

The number of reported cases of influenza increased from 388 last week to 707 cases, of which 227 occurred in South Carolina, 143 in Texas, and 138 in Virginia—70 percent of the total in these 3 States.

Other reports for the current week include 1 case of anthrax in Pennsylvania, 15 cases of amebic, 254 cases of bacillary, and 195 cases of unspecified dysentery, 16 cases of infectious encephalitis, 7 cases of Rocky Mountain spotted fever, 4 cases of smallpox, 15 cases of tularemia, and 134 cases of endemic typhus fever (58 in Texas and 46 in Georgia).

The death rate for the current week in 88 large cities of the United States is 10.1 per 1,000 population, as compared with 10.6 last week and a 3-year (1939–41) average of 10.3.

For the first 7 months of 1942 the birth rate for 41 States and the District of Columbia was 19.5 and the death rate 10.6, as compared with 18.3 and 11.0, respectively, for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended September 12, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended Sept. 12, 1942	Week ended Sept. 13, 1941	Median 1937–41	Week ended Sept. 12, 1942	Week ended Sept. 13, 1941	Median 1937–41	Week ended Sept. 12, 1942	Week ended Sept. 13, 1941	Median 1937–41	Week ended Sept. 12, 1942	Week ended Sept. 13, 1941	Median 1937–41
NEW ENG.												
Maine	1	0	1	------	1	------	4	25	1	1	0	1
New Hampshire	0	0	0	------	------	------	4	2	0	0	0	0
Vermont	0	0	1	------	------	------	4	4	4	0	0	0
Massachusetts	3	4	2	------	------	------	41	33	30	2	3	1
Rhode Island	1	0	0	------	------	------	5	9	0	1	0	0
Connecticut	1	0	0	1	1	1	5	6	4	1	1	0
MID. ATL.												
New York	5	8	13	[1] 2	------	[1] 1	21	81	77	6	5	3
New Jersey	3	1	3	7	4	4	20	19	17	4	1	1
Pennsylvania	3	12	10	1	1	------	36	61	35	4	2	2
E. NO. CEN.												
Ohio	3	10	14	6	4	4	12	23	13	0	0	0
Indiana	6	1	7	------	4	4	8	2	5	0	0	0
Illinois	14	17	14	4	------	3	9	35	21	2	1	1
Michigan [2]	3	4	4	2	------	------	23	73	21	0	0	0
Wisconsin	0	0	2	17	7	21	54	77	30	0	1	1
W. NO. CEN.												
Minnesota	0	4	2	1	1	1	9	0	6	0	0	0
Iowa	3	1	2	1	4	3	4	16	6	0	0	0
Missouri	3	3	3	------	------	2	9	4	4	1	0	0
North Dakota	0	1	1	------	------	------	0	0	0	0	0	0
South Dakota	4	3	1	1	------	------	2	0	0	3	0	0
Nebraska	4	0	0	1	------	------	15	2	1	0	0	0
Kansas	2	3	7	3	2	1	3	3	3	0	1	0
SO. ATL.												
Delaware	0	0	0	------	------	------	1	0	0	0	1	0
Maryland [2]	1	1	3	2	2	2	9	11	3	4	0	0
Dist. of Col.	3	1	1	------	------	------	4	3	2	1	0	0
Virginia	22	6	37	138	66	47	8	15	10	2	1	1
West Virginia	16	4	7	2	------	10	1	11	3	1	2	2
North Carolina	38	40	40	4	------	------	10	40	9	1	0	1
South Carolina	25	36	30	227	123	148	10	32	5	2	2	0
Georgia	31	24	31	11	7	2	0	16	1	2	0	0
Florida	2	1	4	------	7	2	10	4	4	0	0	0
E. SO. CEN.												
Kentucky	5	7	13	------	------	5	20	29	3	0	1	1
Tennessee	12	10	16	3	10	10	17	13	10	2	1	1
Alabama	17	19	31	24	3	6	3	5	3	1	1	1
Mississippi [2]	8	9	19	------	------	------	------	------	------	0	0	0
W. SO. CEN.												
Arkansas	13	11	12	5	2	2	5	28	4	0	0	0
Louisiana	4	5	5	5	3	3	2	7	3	1	1	0
Oklahoma	6	13	11	19	8	20	6	6	4	0	1	0
Texas	32	23	24	143	254	79	2	41	28	1	1	1
MOUNTAIN												
Montana	0	0	1	1	------	2	2	3	3	0	0	0
Idaho	0	0	0	------	------	------	0	2	2	0	0	0
Wyoming	0	0	1	15	4	------	5	3	2	1	0	0
Colorado	8	14	5	19	19	1	5	5	9	0	0	1
New Mexico	2	0	4	1	1	------	0	2	1	0	0	0
Arizona	1	0	0	27	36	14	1	52	5	0	1	0
Utah [2]	0	0	0	3	------	------	15	1	3	0	0	0
Nevada	0	0	------	------	------	------	0	0	------	0	0	------
PACIFIC												
Washington	5	0	1	------	------	------	35	7	8	0	1	1
Oregon	1	3	1	2	6	6	21	8	8	1	0	0
California	10	11	13	9	21	11	47	74	42	1	1	1
Total	321	310	453	707	601	479	527	893	561	46	30	30
36 weeks	8,192	8,443	13,142	82,365	491,922	161,261	468,385	826,240	349,706	2,541	1,513	1,513

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 12, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Sept. 12, 1942	Sept. 13, 1941		Sept. 12, 1942	Sept. 13, 1941		Sept. 12, 1942	Sept. 13, 1941		Sept. 12, 1942	Sept. 13, 1941	
NEW ENG.												
Maine	4	3	2	5	6	6	0	0	0	1	4	3
New Hampshire	0	7	0	3	3	0	0	0	0	0	1	1
Vermont	4	1	1	2	1	1	0	0	0	2	1	0
Massachusetts	1	16	5	58	59	23	0	0	0	2	5	3
Rhode Island	1	2	0	1	4	2	0	0	0	1	0	0
Connecticut	5	19	4	13	10	10	0	0	0	0	1	3
MID. ATL.												
New York	29	109	88	59	72	61	0	0	0	16	30	20
New Jersey	22	41	13	26	15	18	0	0	0	6	7	7
Pennsylvania	7	63	20	47	40	44	0	0	0	15	24	24
E. NO. CEN.												
Ohio	13	35	35	41	49	52	0	0	0	6	14	22
Indiana	11	7	7	16	12	17	0	1	1	5	2	8
Illinois	44	25	25	39	44	78	0	0	0	9	6	35
Michigan [2]	10	20	49	32	47	59	0	2	0	0	7	7
Wisconsin	1	6	6	38	52	46	0	3	0	1	9	4
W. NO. CEN.												
Minnesota	3	24	24	15	11	18	0	0	0	0	2	2
Iowa	8	0	3	11	10	22	0	0	1	2	5	5
Missouri	8	1	1	28	8	15	0	1	1	8	6	10
North Dakota	1	1	1	4	1	1	0	0	0	1	0	1
South Dakota	0	0	0	9	7	3	1	0	0	0	3	0
Nebraska	8	1	1	4	8	8	0	0	0	0	0	0
Kansas	4	1	1	14	44	32	1	0	0	2	3	7
SO. ATL.												
Delaware	0	0	0	1	8	2	0	0	0	2	0	1
Maryland [2]	2	17	2	9	16	14	0	0	0	2	9	9
Dist. of Col	0	3	2	6	11	3	0	0	0	0	0	1
Virginia	9	11	5	22	5	16	0	0	0	11	14	19
West Virginia	3	1	1	32	9	19	0	0	0	4	12	19
North Carolina	7	9	9	43	40	34	0	0	0	4	17	18
South Carolina	3	8	2	16	8	9	0	0	0	8	5	18
Georgia	3	26	2	23	8	13	0	0	0	1	18	18
Florida	0	4	2	1	2	2	0	0	0	1	4	4
E. SO. CEN.												
Kentucky	6	14	4	21	25	26	0	0	0	11	13	27
Tennessee	13	29	3	49	32	28	0	2	0	18	5	27
Alabama	1	38	4	32	18	17	0	0	0	1	7	12
Mississippi [2]	4	5	3	11	11	11	0	0	0	2	8	8
W. SO. CEN.												
Arkansas	6	5	1	3	1	9	0	1	0	6	15	24
Louisiana	5	1	1	3	2	2	0	0	0	11	20	13
Oklahoma	1	2	2	19	10	10	0	0	1	5	11	18
Texas	6	3	8	10	33	24	1	0	0	21	36	47
MOUNTAIN												
Montana	0	2	1	9	9	5	0	0	0	2	2	2
Idaho	0	1	0	2	3	2	0	0	0	1	0	3
Wyoming	0	0	0	1	1	1	0	0	0	0	0	1
Colorado	0	6	5	8	14	8	0	0	2	1	4	7
New Mexico	1	1	1	1	1	5	0	0	0	2	3	5
Arizona	2	0	0	0	1	2	0	0	0	2	1	2
Utah [2]	0	3	3	3	1	6	0	0	0	0	0	1
Nevada	0	0	-----	0	0	-----	0	0	-----	2	0	-----
PACIFIC												
Washington	1	8	2	7	9	10	1	0	0	6	2	2
Oregon	0	6	4	4	2	4	0	0	0	0	3	3
California	10	8	14	29	42	51	0	0	2	1	3	15
Total	267	593	593	830	825	910	4	10	14	202	342	517
36 weeks	2,169	5,199	4,813	91,272	91,866	118,940	625	1,167	8,136	4,700	5,802	8,743

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 12, 1942—Continued

Division and State	Whooping cough, Week ended Sept. 12, 1942	Whooping cough, Week ended Sept. 13, 1941	Week ended Sept. 12, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	40	6	0	0	0	0	0	0	0	0	0
New Hampshire	1	4	0	0	0	0	0	0	0	0	0
Vermont	46	0	0	0	0	0	0	0	0	0	0
Massachusetts	201	194	0	0	0	0	0	0	0	0	0
Rhode Island	4	47	0	0	0	0	0	0	0	0	0
Connecticut	69	41	0	0	2	0	0	0	0	0	0
MID. ATL.											
New York	325	319	0	2	12	0	4	0	0	0	1
New Jersey	197	192	0	0	0	0	0	0	1	0	0
Pennsylvania	247	216	1	0	5	0	0	0	0	0	1
E. NO. CEN.											
Ohio	160	317	0	0	3	0	0	0	0	0	0
Indiana	56	12	0	0	0	1	0	0	0	0	0
Illinois	385	237	0	0	45	0	3	0	0	1	0
Michigan [1]	226	340	0	1	2	0	0	0	0	0	0
Wisconsin	194	239	0	1	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	48	31	0	0	0	0	0	0	0	0	0
Iowa	19	27	0	0	0	0	2	0	0	0	0
Missouri	14	20	0	0	0	8	1	0	0	1	0
North Dakota	6	5	0	0	0	0	0	0	0	0	0
South Dakota	4	19	0	0	0	0	2	0	1	0	0
Nebraska	15	2	0	0	0	0	0	0	0	0	0
Kansas	14	97	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	0	2	0	0	0	0	0	0	0	0	0
Maryland [2]	43	39	0	0	0	2	0	0	2	0	0
Dist. of Col.	26	24	0	0	0	0	0	0	0	0	0
Virginia	24	44	0	0	0	153	0	0	1	0	1
West Virginia	3	31	0	0	0	0	0	0	0	0	0
North Carolina	66	83	0	4	0	0	0	0	0	0	2
South Carolina	31	69	0	0	0	0	0	0	0	2	2
Georgia	33	5	0	1	3	0	0	0	0	1	46
Florida	2	8	0	0	1	0	0	0	0	0	7
E. SO. CEN.											
Kentucky	29	71	0	0	5	0	0	0	1	0	0
Tennessee	63	53	0	0	0	14	0	0	1	3	1
Alabama	40	25	0	0	0	0	0	0	0	0	8
Mississippi [2]			0	0	0	0	0	0	0	0	2
W. SO. CEN.											
Arkansas	14	18	0	3	37	0	0	0	0	3	3
Louisiana	4	2	0	1	4	0	0	0	0	0	2
Oklahoma	4	20	0	0	0	0	0	0	0	0	0
Texas	88	84	0	1	106	0	1	0	0	0	58
MOUNTAIN											
Montana	20	44	0	0	0	0	1	0	0	0	0
Idaho	3	17	0	0	0	0	0	0	0	0	0
Wyoming	6	29	0	0	0	0	1	0	0	0	0
Colorado	10	75	0	0	22	0	1	0	0	0	0
New Mexico	6	25	0	0	0	0	0	0	0	0	0
Arizona	3	14	0	0	0	17	0	0	0	0	0
Utah [2]	10	33	0	0	0	2	0	0	0	0	0
Nevada	4	24	0	0	0	0	0	0	0	2	0
PACIFIC											
Washington	25	76	0	0	0	0	0	0	0	1	0
Oregon	6	29	0	0	0	0	0	0	0	0	0
California	114	223	0	1	7	0	0	0	0	1	0
Total	2,948	3,532	1	15	254	197	16	0	7	15	134
36 weeks	130,991	156,018									

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended August 29, 1942

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	7	0	0	0	3	0	2	0	0	5
Baltimore, Md	0	1	3	1	7	3	9	1	3	0	1	40
Barre, Vt	0	0	-	0	10	0	0	0	0	0	0	2
Billings, Mont	1	0		0	1	0	0	0	2	0	0	6
Birmingham, Ala	0	0	1	0	0	0	1	0	0	0	1	0
Boise, Idaho	0	0	---	0	0	0	0	0	0	0	0	0
Boston, Mass	2	0	--	0	13	3	5	1	19	0	1	33
Bridgeport, Conn	0	0	---	0	0	0	1	0	0	0	0	1
Brunswick, Ga	0	0	----	0	0	0	1	0	0	0	0	0
Camden, N. J	0	0		0	0	0	0	1	0	0	0	11
Charleston, S. C	1	0	4	0	0	0	1	3	1	0	0	0
Charleston, W. Va	2	0	1	0	0	0	0	1	0	0	2	0
Chicago, Ill	6	0	--	0	6	1	14	20	7	0	3	157
Cincinnati, Ohio	0	0	--	0	1	0	0	2	4	0	0	18
Cleveland, Ohio	0	0	4	0	4	1	9	1	11	0	0	39
Columbus, Ohio	0	0	1	1	1	0	1	0	4	0	0	8
Concord, N. H	0	0	-	0	1	0	0	0	0	0	0	0
Cumberland, Md	0	0	--	0	0	0	0	0	0	0	0	0
Dallas, Tex	1	0	-	0	0	0	1	0	2	0	0	12
Denver, Colo	0	0	7	0	3	0	2	0	1	0	1	11
Detroit, Mich	0	0	--	1	5	0	6	4	11	0	1	120
Duluth, Minn	0	0	---	0	0	0	2	0	0	0	0	4
Fall River, Mass	0	0	----	0	0	0	0	0	3	0	0	3
Fargo, N. Dak	0	0	-----	0	0	0	1	1	0	0	0	2
Flint, Mich	0	0	---	0	0	0	2	0	0	0	0	8
Fort Wayne, Ind	0	0	--	0	0	0	1	0	0	0	1	0
Frederick, Md	0	0	-	0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	--	0	0	0	1	0	0	0	0	0
Great Falls, Mont	1	1	----	0	0	0	0	0	0	0	2	2
Hartford, Conn	0	0	--	0	0	0	4	1	1	0	0	9
Helena, Mont	0	0	--	0	0	0	0	0	0	0	0	5
Houston, Tex	1	0	---	1	0	0	5	0	4	0	1	2
Indianapolis, Ind	3	0	-----	0	0	0	3	1	1	0	0	11
Kansas City, Mo	0	0	------	0	2	0	3	0	2	0	0	2
Kenosha, Wis	0	0	---	0	0	0	0	0	5	0	0	16
Little Rock, Ark	0	0		0	0	0	1	0	0	0	0	0
Los Angeles, Calif	1	0	1	0	7	0	4	0	8	0	1	18
Lynchburg, Va	0	0	-	0	0	0	0	0	0	0	0	1
Memphis, Tenn	0	0	----	0	1	0	2	0	1	0	0	18
Milwaukee, Wis	0	0	-----	0	7	0	3	8	6	0	0	31
Minneapolis, Minn	0	0	---	0	1	0	3	1	1	0	0	19
Missoula, Mont	0	0	----	0	0	0	0	0	0	0	0	0
Mobile, Ala	0	0	1	0	0	0	0	0	2	0	1	0
Nashville, Tenn	0	0	-	0	0	0	4	1	1	0	2	5
Newark, N. J	0	0	3	0	15	1	0	8	4	0	0	40
New Haven, Conn	0	0	--	0	0	0	0	0	1	0	0	3
New Orleans, La	0	0	1	0	1	0	8	1	0	0	0	0
New York, N. Y	9	2	1	1	14	1	50	12	24	0	4	143
Omaha, Nebr	0	0	----	0	1	0	1	0	1	0	0	3
Philadelphia, Pa	1	0	---	0	6	2	16	0	11	0	1	84
Pittsburgh, Pa	1	0	----	1	2	0	5	1	1	0	4	15
Portland, Maine	0	0	----	0	2	0	0	0	2	0	0	0
Providence, R. I	0	0	----	0	3	0	0	0	1	0	0	22
Pueblo, Colo	0	0	------	0	0	0	0	0	0	0	0	0
Raleigh, N. C	0	0	------	0	0	0	1	0	0	0	1	2
Reading, Pa	0	0	-----	0	0	0	0	0	0	0	0	2
Richmond, Va	0	0	1	1	0	0	1	0	2	0	1	2

City reports for week ended August 29, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va	1	0	------	0	0	0	0	0	0	0	0	0
Rochester, N. Y	0	1	------	0	1	1	0	1	0	0	0	15
Sacramento, Calif	0	0	1	0	0	0	0	0	1	0	0	0
Saint Joseph, Mo	0	0	------	0	0	0	0	0	0	0	0	0
Saint Louis, Mo	0	0	------	0	1	2	6	4	3	0	2	5
Saint Paul, Minn	0	0	------	0	1	0	3	1	1	0	0	27
Salt Lake City, Utah	0	0	------	0	5	0	2	0	0	0	0	7
San Antonio, Tex	0	0	------	0	0	0	7	0	0	0	0	2
San Francisco, Calif	0	0	1	0	11	0	1	0	4	0	0	6
Savannah, Ga	1	0	------	0	0	0	1	1	0	0	0	3
Seattle, Wash	1	0	------	1	7	0	5	0	0	0	1	6
Shreveport, La	0	0	------	0	0	0	0	0	1	0	1	0
South Bend, Ind	0	0	------	0	1	0	0	1	1	0	0	5
Spokane, Wash	0	0	------	0	4	0	3	0	1	0	0	2
Springfield, Ill	0	0	------	0	0	0	0	0	1	0	0	0
Springfield, Mass	0	0	------	0	5	1	1	0	1	0	0	2
Superior, Wis	0	0	------	0	0	0	0	0	0	0	0	0
Syracuse, N. Y	0	0	------	0	9	0	0	0	0	0	0	21
Tacoma, Wash	0	0	------	0	23	0	1	0	0	0	0	0
Tampa, Fla	0	0	------	0	0	0	0	0	0	0	0	0
Terre Haute, Ind	0	0	------	0	0	0	1	0	0	0	0	0
Topeka, Kans	0	0	------	0	1	0	0	0	1	0	0	3
Trenton, N. J	0	0	2	0	2	0	0	0	0	0	1	0
Washington, D. C	2	0	------	0	1	1	5	1	5	0	0	11
Wheeling, W. Va	0	0	------	0	0	0	2	0	0	0	0	7
Wichita, Kans	0	0	------	0	1	0	3	0	2	0	0	0
Wilmington, Del	0	0	------	0	0	0	1	0	2	0	0	0
Wilmington, N. C	1	0	------	0	0	0	0	0	0	0	0	7
Winston-Salem, N. C	1	0	------	0	0	0	3	0	1	0	0	0
Worcester, Mass	0	0	------	0	0	0	5	0	1	0	1	14

Dysentery, amebic—Cases: Atlanta, 2; Little Rock, 1.

Dysentery, bacillary—Cases: Atlanta, 2; Baltimore, 2, Chicago, 7; Columbus, 1; Detroit, 1; Los Angeles, 2; Nashville, 1; New York, 18; Richmond, 4; St. Louis, 2

Dysentery, unspecified—Cases: San Antonio, 4.

Rocky Mountain spotted fever—Cases. Nashville, 1.

Typhus fever—Cases: Atlanta, 1; Brunswick, 3; Charleston, S. C., 4; Houston, 1; Mobile, 1; New Orleans, 1; Savannah, 3; Tampa, 2.

Rates (annual basis) per 100,000 population, for the group of 87 cities in the preceding table (estimated population, 1942, 33,323,772)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Week ended Aug. 29, 1942	5.79	6.26	1.25	29.26	35.21	27.38	0.00	5.48	167.90
Average for week 1937–41	9.17	4.43	1.58	[1] 25.78	36.60	31.47	0.32	9.65	168.05

[1] Median.

TERRITORIES AND POSSESSIONS

Panama Canal Zone

Notifiable diseases—May 1942.—During the month of May 1942, certain notifiable diseases were reported in the Panama Canal Zone, and terminal cities and vicinities, as follows:

Disease	Panama		Colon		Canal Zone		Outside the zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	7	------	------	------	1	------	------	------	8	------
Diphtheria	4	------	2	------	1	------	1	------	8	------
Dysentery (amebic)	6	------	4	------	3	------	4	------	17	------
Dysentery (bacillary)	------	------	------	------	1	------	------	1	1	1
Malaria [1]	27	3	5	------	807	4	290	10	1,129	17
Measles	9	------	1	------	78	------	4	------	92	------
Meningitis, meningococcus	2	1	1	------	------	------	------	------	3	1
Mumps	1	------	------	------	2	------	------	------	3	------
Paratyphoid fever	1	------	------	------	4	------	2	------	7	------
Pneumonia	------	10	------	2	59	2	------	------	[2] 59	14
Tuberculosis	------	14	------	7	3	1	------	11	[2] 3	33
Typhoid fever	1	------	1	------	3	------	------	------	5	------

[1] Includes 168 recurrent cases

[2] Cases reported in the Canal Zone only.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended August 15, 1942.—During the week ended August 15, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	1	2		6	1			1	2	13
Chickenpox		5		15	53	1	7	8	36	125
Diphtheria		8	1	9	2		2		1	23
Dysentery				5	1					6
German measles		6			3		2		2	13
Influenza		4			3		1		6	14
Lethargic encephalitis						3			1	4
Measles				62	23	2	19		2	108
Mumps		8		7	83	11	33	6	68	216
Pneumonia		2			4					6
Poliomyelitis		4	15	9	4	1	1		2	36
Scarlet fever	3	5	4	33	42	8	10	16	13	134
Trachoma						1				1
Tuberculosis	7	9	6	120	52		29		39	262
Typhoid and paratyphoid fever			1	10	6	1		1		19
Whooping cough			7	187	77	6		8	21	306
Other communicable diseases		39		3	237	92		1	4	376

CUBA

Provinces—Notifiable diseases—4 weeks ended July 18, 1942.—During the 4 weeks ended July 18, 1942, cases of certain notifiable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1	2	5	7		22	37
Chickenpox						1	1
Diphtheria	1	25	4	3	1	3	37
Hookworm disease						2	2
Leprosy		2	2			2	6
Malaria	139	18		12	40	132	341
Measles		17	1	1		1	20
Poliomyelitis	2	11	5	2	2	36	58
Rabies		1					1
Scarlet fever		1					1
Tuberculosis	27	48	22	73	22	42	234
Typhoid fever	28	80	20	79	14	49	270
Whooping cough				2			2

[1] Includes the city of Habana.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalance of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Indochina—Laos.—For the period August 11–20, 1942, 1 case of plague was reported in Laos, Indochina.

Madagascar.—For the period August 11–20, 1942, 2 cases of plague were reported in Madagascar.

Morocco.—During the week ended August 22, 1942, 14 cases of plague were reported in Morocco.

Typhus Fever

Iraq.—During the week ended July 18, 1942, 5 cases of typhus fever were reported in Iraq.

Morocco.—During the week ended August 22, 1942, 58 cases of typhus fever were reported in Morocco.

Rumania.—During the week ended August 29, 1942, 10 cases of typhus fever were reported in Rumania.

Turkey.—During the week ended August 29, 1942, 11 sporadic cases of typhus fever were reported in Turkey.

Yellow Fever

Ivory Coast—Bobo Dioulasso.—On September 1, 1942, 2 deaths from suspected yellow fever were reported in Bobo Dioulasso, Ivory Coast.

COURT DECISION ON PUBLIC HEALTH

Sewage disposal—pollution of watercourse on private property—liability of city.—(Michigan Supreme Court; *Dohany* v. *City of Birmingham et al.*, 2 N.W.2d 907; decided March 17, 1942.) The plaintiff owned about 21 acres of land, no part of which was within the corporate limits of the defendant city of Birmingham. The land had been acquired for residential purposes and was traversed by a meandering, natural watercourse having a channel and well-defined banks. At times this watercourse was dry, but whenever there was a heavy rainfall it was the outlet for raw sewage discharged from the defendant city's sewer.

In an action by the plaintiff for an injunction the city, in effect, admitted that under certain conditions raw sewage was discharged,

through the city sewer, across plaintiff's land but claimed the right to do so because the sewage was diluted at such times by surface water from excessive rainfall. The city relied upon holdings that a riparian owner was allowed reasonable use of a natural watercourse in common with other riparian owners, even to the extent of a certain amount of pollution, but the Supreme Court of Michigan said that the rights of a riparian owner were not involved in the instant case. "No part of the natural watercourse lies within the corporate limits of the defendant city. The city is not a riparian owner." Respecting the defendants' claim that their position was analogous to that of a riparian owner because surface water found its natural outlet in plaintiff's watercourse, the court stated that it did not follow that the city could make an unreasonable use of plaintiff's watercourse for disposing of raw sewage.

According to the court, no public necessity warranted a city in injuring the rights of riparian owners by polluting a stream with its sewers. Such rights were protected by the constitution and could not be taken away except by due process of law. It could not be successfully maintained that the city's duty to care for its sewage disposal continued only during normal weather and ended when there was an excessive rainfall. Nor, continued the court, did plaintiff's right to have the nuisance abated depend upon the use of water from the natural watercourse for drinking or domestic purposes. "The value of plaintiff's land is materially lessened when sewage is discharged across his land with the attendant bad odors and the visible evidence of human excrement."

The decree allowed the city a reasonable time to make the necessary improvements and permanently enjoined defendants from thereafter discharging raw sewage into the watercourse on or across plaintiff's land.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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Public Health Reports

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Hospital Care in a Surveyed Group

List of Public Health Service Publications

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Public Health Reports

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FREQUENCY AND VOLUME OF HOSPITAL CARE FOR SPECIFIC DISEASES IN RELATION TO ALL ILLNESSES AMONG 9,000 FAMILIES, BASED ON NATION-WIDE PERIODIC CANVASSES, 1928-31[1]—Continued

By SELWYN D. COLLINS, *Principal Statistician, United States Public Health Service*

CONTENTS

III. COMPARISON OF HOSPITALIZED ILLNESS AND GENERAL MORBIDITY

In view of the interest in hospital statistics as an index of sickness in the community, the age incidence of the two kinds of cases may be compared as well as the make-up of the total case load with respect to diagnosis.

Age incidence of hospital and total cases of illness.—It may be seen in figure 12 and table 4 that the age curves for hospitalized illness differ from those for all recorded illness in that (*a*) puerperal and female genital diseases are relatively more important in hospital practice, (*b*) there is less difference between the sexes in the frequency of hospital cases than in all cases for diagnoses common to males and females, and (*c*) the tendency of the rates to increase with age is slightly greater for all cases than for hospital cases.

With respect to surgical cases, the age curves for total and hospital cases appear to be more similar and this is confirmed by the fact that the percentage of cases that were hospitalized does not vary materially in the different ages; however, the percentages are consistently higher for females than males. With respect to nonsurgical cases, the largest difference between the curves for total and hospital cases is (*a*) the relatively larger peak among hospital cases for female genital and puerperal diagnoses, and (*b*) the absence of any consistent sex differ-

[1] The first two sections of this paper, Source and character of data, and Extent of hospital care as measured by various types of rates, were published in the Public Health Reports, 57: 1399-1427 (September 18, 1942).

ences in the incidence of hospital cases for diagnoses common to the two sexes, but a consistently higher incidence of total cases of the same diagnoses among adult females than males.

Since minor respiratory and minor digestive diseases constitute 42 percent of the total recorded illnesses in these families but only

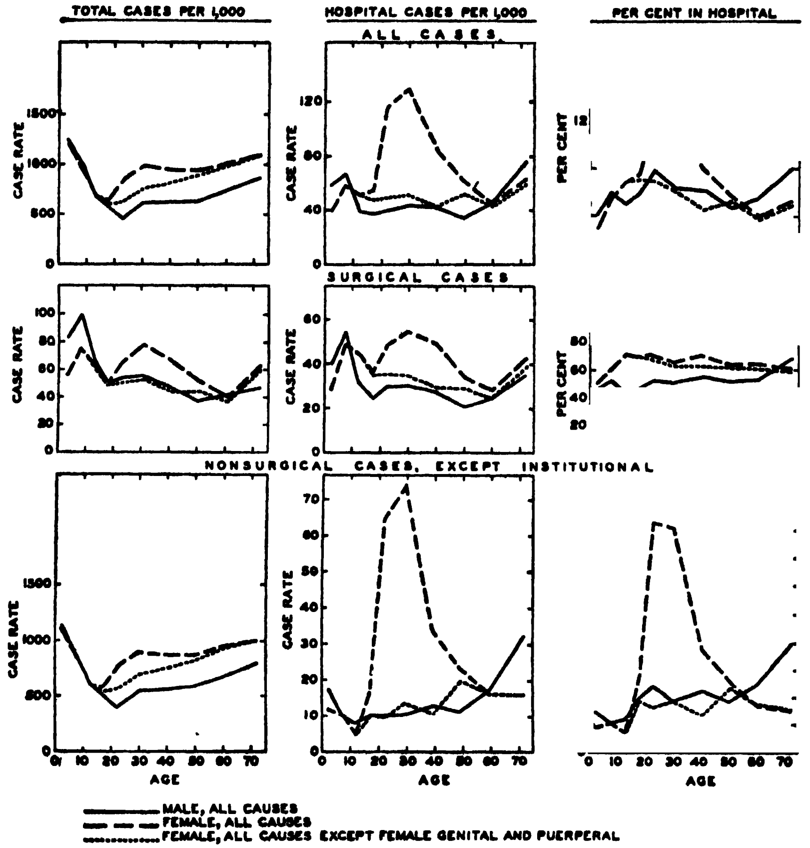

FIGURE 12.—Age incidence among males and females of total and hospital cases from all causes and the percentage of cases hospitalized—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Total includes all except year-long cases; nonsurgical includes all except those in mental and tuberculosis hospitals and other sanatoriums and year-long cases. Scales are so made that the adjusted rate for all ages of both sexes represents an interval on the vertical rate scale that corresponds to 30 years on the horizontal age scale.)

about 2 percent of the hospital cases, curves have been plotted in figure 13 for total, bed and hospital cases of all diagnoses except minor respiratory and minor digestive diseases (table 5). As might be expected, the correspondence with the age curves of hospital cases is greater, particularly for bed cases; but there is still a relatively greater preponderance of deliveries and female genital diagnoses in the hospital data.

TABLE 4.—*Total and hospital case rates and percentage of cases hospitalized among surgical and nonsurgical cases of all causes at specific ages for each sex—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

Type of case	All ages[1]			Age									
	Number of cases	Adjusted[2]	Crude	Under 5	5–9	10–14	15–19	20–24	25–34	35–44	45–54	55–64	65 and over
		Total cases[3] per 1,000 population during year											
All cases:													
Both sexes	32,736	823	850	1,211	978	679	600	672	820	774	760	845	979
Male	14,589	720	772	1,240	1,000	684	562	454	610	617	625	723	851
Female	18,137	915	925	1,187	957	674	638	832	976	932	925	991	1,078
Female, except genital and puerperal	16,597	833	846	1,185	955	668	589	25	750	806	877	978	1,070
Surgical cases:													
Both sexes	2,439	60.4	63.3	68.2	88.0	62.8	49.5	59.9	68.2	56.8	48.3	41.4	57.1
Male	1,187	58.2	62.8	82.3	99.3	66.1	50.0	53.7	56.2	47.3	36.9	42.3	48.1
Female	1,252	62.0	63.8	54.0	77.0	59.5	49.2	64.5	77.8	66.4	51.1	40.4	64.2
Female, except genital and puerperal	1,068	52.4	54.4	53.3	77.0	59.5	47.9	49.8	52.5	44.4	44.5	37.4	60.6
Nonsurgical[4] except institutional:													
Both sexes	30,224	759	784	1,142	888	614	547	609	749	715	714	800	915
Male	13,370	660	708	1,157	899	617	509	400	552	567	586	677	794
Female	16,844	851	858	1,133	878	610	586	762	895	864	871	949	1,009
Female, except genital and puerperal	15,488	778	789	1,131	877	604	538	570	695	760	830	939	1,004
		Hospital cases[3] per 1,000 population during year											
All cases:													
Both sexes	2,341	61.6	60.7	49.7	62.6	44.7	45.2	83.1	92.6	62.6	45.1	44.8	68.1
Male	890	46.0	47.1	58.0	66.0	38.2	36.7	39.1	42.5	42.0	33.1	44.8	75.5
Female	1,447	74.5	73.7	39.9	59.4	51.2	53.8	115.1	129.7	83.4	59.8	44.8	62.4
Female, except genital and puerperal	956	48.6	48.7	39.9	59.4	51.2	46.6	48.2	50.6	41.3	51.1	41.9	58.8
Surgical cases:													
Both sexes	1,452	36.6	37.7	33.7	50.9	36.8	29.5	39.2	42.9	37.4	26.3	25.1	38.1
Male	618	30.8	32.7	39.5	53.9	30.4	23.6	29.1	29.6	26.9	20.1	23.6	34.3
Female	834	41.7	42.5	27.9	48.0	43.2	35.5	46.5	52.8	48.1	33.9	26.9	41.0
Female, except genital and puerperal	686	33.9	35.0	27.9	48.0	43.2	34.1	34.3	34.0	28.8	28.6	23.9	37.4
Nonsurgical[4] except institutional:													
Both sexes	816	22.8	21.2	15.6	10.3	6.3	13.4	41.5	47.0	23.3	16.7	17.0	23.0
Male	240	13.1	12.7	17.8	10.3	7.8	10.5	10.1	10.8	13.1	11.4	17.4	32.0
Female	572	30.4	29.1	11.9	10.4	4.9	16.4	64.5	73.8	33.5	23.2	16.4	16.0
Female, except genital and puerperal	229	12.3	11.7	11.9	10.4	4.9	10.5	9.8	13.6	10.8	19.9	16.4	16.0
		Percent of cases hospitalized											
All cases:													
Both sexes	------	7.5	7.2	4.1	6.4	6.6	7.6	12.4	11.3	8.1	5.9	5.3	7.0
Male	------	6.4	6.1	4.7	6.6	5.6	6.5	8.6	7.0	6.8	5.3	6.2	8.9
Female	-----	8.1	8.0	3.4	6.2	7.6	8.5	13.9	13.3	8.9	6.5	4.5	5.8
Female, except genital and puerperal	-----	5.8	5.8	3.4	6.2	7.7	7.9	7.7	6.7	5.1	5.8	4.3	5.5
Surgical cases:													
Both sexes	-----	60.6	59.5	49.5	57.9	58.5	59.6	65.4	62.5	65.9	60.7	60.7	66.7
Male	------	53.0	52.1	48.1	54.3	46.1	47.4	54.2	52.6	56.7	54.4	55.9	71.4
Female	------	67.3	66.6	51.7	62.3	72.6	72.0	72.2	67.9	72.4	66.2	66.7	63.9
Female, except genital and puerperal	-----	64.7	64.2	52.4	62.3	72.6	71.2	68.9	64.7	64.9	64.2	64.0	61.8
Nonsurgical[4] except institutional:													
Both sexes	------	3.0	2.7	1.4	1.2	1.0	2.5	6.8	6.3	3.8	2.3	2.1	2.5
Male	------	2.0	1.8	1.5	1.1	1.3	2.1	2.5	2.0	2.3	1.9	2.6	4.0
Female	------	3.6	3.4	1.1	1.2	.8	2.8	8.5	8.3	3.9	2.7	1.7	1.6
Female, except genital and puerperal	------	1.6	1.5	1.1	1.2	.8	1.9	1.7	2.0	1.4	2.4	1.7	1.6

[1] All ages includes a few of unknown age; both sexes includes a few of unknown sex.

[2] Rates per 1,000 population are adjusted by the direct method to the age distribution of the white population of the death registration States in 1930 as a standard population; this population is given for specific ages in table 1 of a preceding paper (4). Figures in the "adjusted" column for percentage of cases represent the percentage that the adjusted rate per 1,000 for hospital cases is of the adjusted rate for total cases.

[3] Total cases represent periods of illness of 1 day or longer (disabling or nondisabling) regardless of the number of diagnoses; that is, these totals for all causes are the sums of data for cases with sole or primary diagnoses. Cases with prior onset but causing illness during the study year are included.

Hospital cases include any of these cases that were in the hospital for 1 night or longer during the study year, except as stated in note 4 below.

[4] The few cases in a hospital throughout the study year are excluded from all data in this table (16 cases). All other nonsurgical cases in mental and tuberculosis hospitals and other sanatoriums (73 cases) are excluded from the nonsurgical cases only (total and hospital); 2 short surgical cases of this type were included as negligible. Thus the "all cases" which means surgical plus nonsurgical includes these 73 institutional cases.

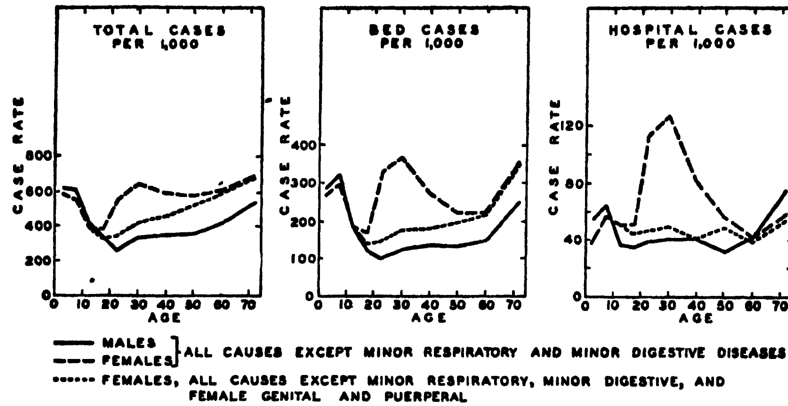

FIGURE 13.—Age incidence among males and females of total, bed, and hospital cases from all causes except minor respiratory and minor digestive diseases—8.758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Sole or primary diagnoses for all except year-long hospital cases. Scales are so made that the adjusted rate for all ages of both sexes represents an interval on the vertical rate scale that corresponds to 30 years on the horizontal age scale.)

TABLE 5.—*Total, bed and hospital case rates for all causes except minor respiratory and minor digestive diseases among persons of specific ages for each sex— 8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

[Sole or primary diagnoses]

Sex	All ages [1]			Age									
	Number of cases	Adjusted [2]	Crude	Under 5	5–9	10–14	15–19	20–24	25–34	35–44	45–54	55–64	65 and over
		Total cases [3] per 1,000 population during year											
Both sexes	19,077	488	495	598	582	397	360	427	511	467	457	506	626
Male	8,235	411	436	616	611	408	345	259	331	346	359	421	542
Female	10,835	556	553	582	554	387	376	550	645	588	576	607	691
Female, except genital and puerperal	9,295	474	474	580	552	381	327	343	419	462	528	594	683
		Bed cases [3] per 1,000 population during year											
Both sexes	8,882	225	231	276	307	184	144	229	260	202	172	182	310
Male	3,568	173	189	284	321	184	120	101	122	134	132	149	249
Female	5,308	269	271	267	294	185	167	323	362	271	221	221	357
Female, except genital and puerperal	4,091	205	209	267	294	182	136	145	174	176	193	214	349
		Hospital cases [3] per 1,000 population during year											
Both sexes	2,283	60.1	59.2	47.0	60.9	44.0	43.9	82.6	91.0	62.1	43.3	42.1	66.1
Male	761	44.5	45.6	55 1	64.6	37.3	35.4	39.1	40.4	41.0	32.0	42.3	75.5
Female	1,418	73 0	72.2	37.3	57.3	50.8	52.5	114.3	128.5	83.4	57.1	41.8	58.8
Female, except genital and puerperal	927	47.1	47.2	37.3	57.3	50.8	45.3	47.4	49.4	41.3	48.4	38.9	55.2

[1] All ages includes a few of unknown age; both sexes includes a few of unknown sex.
[2] Adjusted for age differences—see note 2 to table 4 for method.
[3] Total cases refer to disabling and nondisabling cases which lasted for 1 or more days, including cases with prior onset that extended into the study year. Bed cases include any of these cases that were in bed for 1 day or longer and hospital cases include any that were in a hospital for 1 night or longer during the study year. Cases in a hospital throughout the study year are excluded.

Figure 14 shows age curves for the five diagnoses that make up two-thirds of the hospital admissions; the data are shown by sex for the three diagnoses that are common to the two sexes (table 6). With

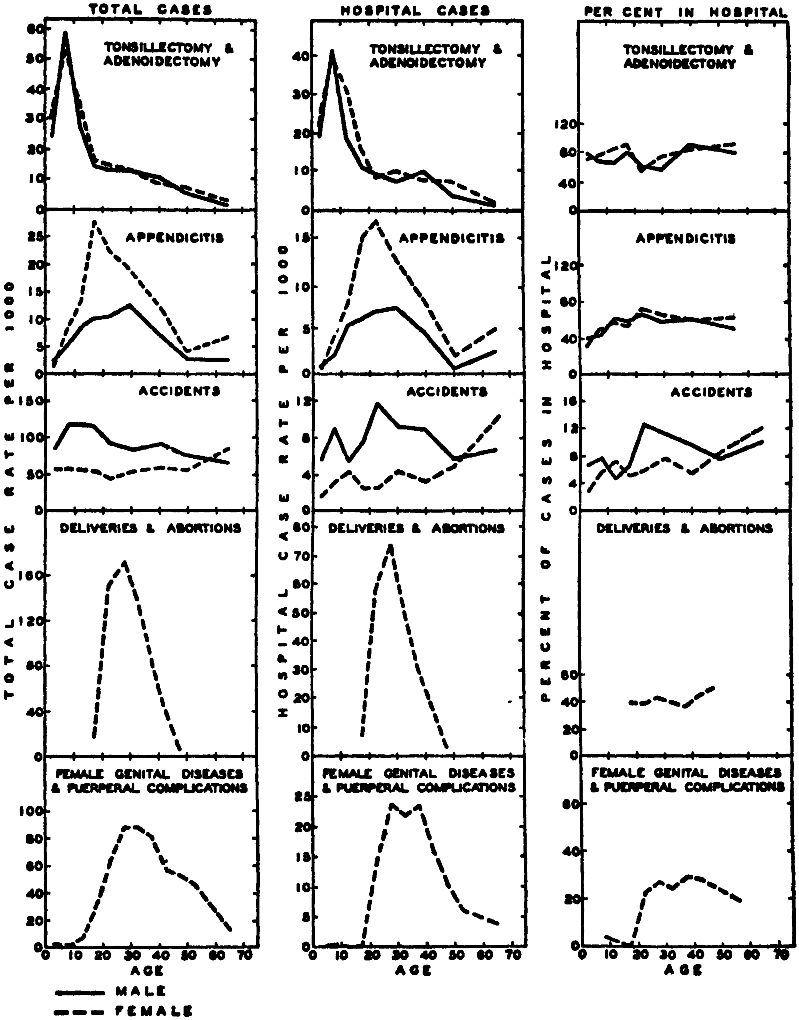

FIGURE 14.—Age incidence among males and females of total and hospital cases of certain diagnoses and the percentage of cases hospitalized—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Sole, primary, and contributory diagnoses for all cases; scales are so made that the adjusted rate for all ages of both sexes represents an interval on the vertical rate scale that corresponds to 20 years on the horizontal age scale. Deliveries and female genital diseases are here shown in 5-year age groups, but table 6 shows only 10-year groups above 25 years.)

respect to tonsillectomy and appendicitis, the age and sex differences in the incidence of these diseases are similar for hospital cases and for all cases. This is verified by the fact that there are no large age or sex differences in the percentage of cases hospitalized. However,

TABLE 6.—*Total case rates, hospital case rates, and percentage of cases hospitalized for 5 diagnoses among persons of specific age and sex—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

[Sole, primary and contributory diagnoses]

Diagnosis and sex	All ages [1]: Number of cases	All ages [1]: Adjusted [2]	All ages [1]: Crude	Age [4]: Under 5	5–9	10–14	15–19	20–24	25–34	35–44	45–54	55 and over
		Total cases [3] per 1,000 population during year										
Tonsillectomy and adenoidectomy:												
Both sexes	841	18.0	21.9	27.0	55.1	31.1	15.4	14.2	13.1	9.9	6.0	2.4
Male	403	17.5	21.4	23.9	58.2	27.8	14.4	13.4	12.9	11.1	4.9	1.6
Female	438	18.6	22.5	30.6	52.2	34.4	16.4	14.7	13.3	8.8	7.3	3.2
Appendicitis:												
Both sexes	352	9.6	9.1	1.5	6.3	10.5	18.4	17.0	15.6	9.6	3.3	4.5
Male	120	6.6	6.4	1.8	5.0	8.3	9.8	10.1	12.1	7.0	2.7	2.4
Female	232	12.3	11.8	1.1	7.6	12.8	26.9	22.0	18.2	12.2	4.0	6.5
Accidents:												
Both sexes	2,889	74.0	75.0	70.9	85.9	85.8	81.6	64.2	65.6	74.4	66.2	74.5
Male	1,774	90.8	93.9	84.0	115.2	115.6	111.3	91.7	82.0	91.3	74.3	66.1
Female	1,115	56.1	56.8	57.7	57.3	55.6	51.9	44.1	53.4	57.3	56.4	82.9
Deliveries and abortions per 1,000 females: Female	910	48.0	46.4	------	-----	-----	18.4	151.8	153.8	65.1	4.0	-----
Female genital diseases and puerperal complications, per 1,000 females: Female	732	39.5	37.2	2.2	1.7	5.7	30.1	63.6	87.4	69.8	49.1	13.0
All other diagnoses:												
Surgical:												
Both sexes	829	21.6	21.5	33.6	17.1	10.3	14.4	16.5	22.7	22.8	24.8	28.7
Male	449	22.7	23.8	50.2	20.2	13.9	13.8	13.4	20.8	18.1	21.1	33.0
Female	380	20.5	19.4	16.4	14.2	6.6	15.1	18.8	24.1	27.4	29.2	24.4
Nonsurgical:												
Both sexes	27,733	693.1	719.5	1,139.3	850.2	557.6	461.3	462.0	598.4	626.6	673.2	880.6
Male	12,487	616.9	660.8	1,143.9	843.3	538.5	426.3	337.8	501.7	509.6	543.1	754.2
Female	15,234	767.9	776.2	1,139.0	857.0	577.0	496.4	552.7	670.2	744.8	832.7	1,008.1
		Hospital cases [3] per 1,000 population during year										
Tonsillectomy and adenoidectomy:												
Both sexes	636	13.53	16.50	20.32	39.72	24.08	13.11	8.49	9.04	8.77	5.37	2.02
Male	291	12.50	15.40	19.23	40.07	18.25	11.13	8.95	7.49	10.07	3.79	1.61
Female	345	14.44	17.58	21.61	39.38	30.00	15.10	8.16	10.19	7.46	7.30	2.44
Appendicitis:												
Both sexes	211	5.81	5.47	.54	2.97	6.35	10.16	12.27	9.93	5.90	1.19	3.64
Male	69	3.94	3.65	.71	2.18	5.22	5.89	6.71	7.08	4.36	.54	2.42
Female	142	7.64	7.23	.37	3.80	7.50	14.45	16.33	12.04	7.46	1.99	4.88
Accidents:												
Both sexes	209	5.67	5.42	3.45	5.77	4.60	4.92	6.13	6.03	5.73	5.07	8.09
Male	139	7.48	7.36	5.34	8.51	5.22	7.20	11.19	8.74	8.39	5.42	6.45
Female	70	4.08	3.57	1.49	3.11	3.97	2.63	2.45	4.01	3.05	4.65	9.76
Deliveries and abortions per 1,000 females: Female	367	19.34	18.70	------	-----	-----	7.22	59.59	63.62	25.08	1.99	-----
Female genital diseases and puerperal complications per 1,000 females: Female	175	9.23	8.92	------	.85	-----	-----	14.69	23.16	20.67	8.63	4.07
All other diagnoses:												
Surgical:												
Both sexes	421	11.88	10.92	12.33	7.35	3.94	4.92	10.38	12.41	13.32	16.11	21.04
Male	216	12.01	11.43	18.87	9.93	5.65	5.24	7.88	10.41	9.40	13.55	23.37
Female	205	11.79	10.44	5.59	4.84	2.21	4.60	12.24	13.90	17.28	19.26	18.70
[illegible]urgical:												
[illegible]oth sexes	642	17.72	16.66	20.50	13.65	9.85	14.19	13.69	16.13	16.02	18.50	32.38
[illegible]ale	304	17.07	16.09	23.50	14.89	9.13	11.13	6.71	12.49	14.77	14.63	37.87
[illegible]male	338	18.22	16.97	15.65	12.44	10.59	17.07	18.78	18.84	17.28	23.24	26.83

[1] A[illegible] includes a few of unknown age; both sexes includes a few of unknown sex.

[2] A[illegible]d for age differences—see note 2 to table 4 for method.

[3] To[illegible]es refer to disabling and nondisabling cases which lasted for 1 or more days, including cases with prior o[illegible]t extended into the study year. Hospital cases include any of these cases that were in a hospital fo[illegible]t or longer during the study year.

The r[illegible]r 1,000 for all ages (adjusted) for hospital cases for sole and primary diagnoses were: Tonsillectomy and [illegible]noidectomy, 13.28; appendicitis, 5.18; accidents, 5.59; deliveries and abortions per 1,000 females, 19.29; female genital and puerperal complications per 1,000 females, 6.59.

[4] Percent in hospital plotted in fig. 14 in broader age groups. Age 45 years and over: Tonsillectomy and adenoidectomy, male 31.8, female 93.4; appendicitis, male 50.0, female 64.3; female genital diseases and puerperal complications, female 20.0. Age 40–49, deliveries and abortions, female 45.3. Age under 15, female genital, female 4.3. Deliveries and female genital diseases are shown here in 10-year groups above 25 years but are plotted in [illegible]ear groups in fig. 14.

TABLE 6.—*Total case rates, hospital case rates, and percentage of cases hospitalized for 5 diagnoses among persons of specific age and sex—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*—Continued

Diagnosis and sex	All ages: Number of cases	All ages: Adjusted	All ages: Crude	Age: Under 5	Age: 5–9	Age: 10–14	Age: 15–19	Age: 20–24	Age: 25–34	Age: 35–44	Age: 45–54	Age: 55 and over
		Percent of cases hospitalized										
Tonsillectomy and adenoidectomy:												
Both sexes	------	75.3	75.6	75.2	73.0	77.5	87.0	58.1	68.9	88.1	90.0	83.3
Male	------	71.4	72.2	79.4	69.3	66.7	81.0	61.5	58.1	90.9	77.8	100.0
Female	------	78.7	78.8	71.6	77.0	86.1	92.0	55.6	76.7	84.6	100.0	75.0
Appendicitis:												
Both sexes	------	60.4	59.9	37.5	47.2	60.4	55.4	72.2	63.6	61.4	36.4	81.8
Male	------	59.7	57.5	40.0	42.9	63.2	60.0	66.7	58.6	61.9	20.0	100.0
Female	------	62.1	61.2	33.3	50.0	58.6	53.7	74.1	66.1	61.1	50.0	75.0
Accidents:												
Both sexes	------	7.7	7.2	4.9	6.7	5.4	6.0	9.6	9.2	7.7	7.7	10.9
Male	------	8.2	7.8	6.4	7.4	4.5	6.5	12.2	10.7	9.2	7.3	9.8
Female	------	7.0	6.3	2.6	5.4	7.1	5.1	5.6	7.5	5.3	8.2	11.8
Deliveries and abortions: Female	------	40.3	40.3	------	------	------	39.3	39.2	41.4	38.5	50.0	------
Female genital diseases and puerperal complications: Female	------	23.4	23.9	------	20.0	------	------	23.1	26.5	29.6	17.6	31.3
All other diagnoses:												
Surgical:												
Both sexes	------	54.9	50.8	36.8	42.9	38.3	34.1	62.9	54.7	58.5	65.1	73.2
Male	------	52.9	48.1	37.6	49.1	40.6	38.1	58.3	50.0	51.9	64.1	70.7
Female	------	57.6	53.9	34.1	34.1	33.3	30.4	65.2	57.7	63.0	65.9	76.7
Nonsurgical:												
Both sexes	------	2.6	2.3	1.8	1.6	1.8	3.1	3.0	2.7	2.6	2.7	3.7
Male	------	2.8	2.4	2.1	1.8	1.7	2.6	2.0	2.5	2.9	2.7	5.0
Female	------	2.4	2.2	1.4	1.5	1.8	3.4	3.4	2.8	2.3	2.8	2.7

these are diagnoses in which 60 to 75 percent of the cases are hospitalized so that the hospital cases make up a considerable share of the total cases under consideration. The age curves for all accidents and for hospitalized accidents are not so similar. Hospitalized accident cases show relatively higher rates for adult males than is true of total cases; this is confirmed by the curves of the percentage of cases hospitalized which show considerable excesses for males over females in the ages 20 to 45 years. For deliveries and female genital diseases, the curves for hospitalized and total cases are fairly similar except where the numbers of cases are small.

In this small study there are not enough hospital cases of the many other diagnoses to set up age curves that have any degree of reliability. However, table 7 shows in broad age groups total and hospital case rates and the proportions of cases that were hospitalized. The table shows considerable variation in the percentages hospitalized at the different ages, but the variability from one diagnosis to another is much greater than that from age to age for a given diagnosis. Thus, although the age curves of specific diagnoses may be similar for hospital and total cases, the age curves for all diagnoses vary because the make-up of the hospital case load is radically different from that of all cases of illness recorded in this family study.

Diagnosis distribution of hospital and total cases and days of illness.—The distribution of the hospital case load according to diagnosis is

TABLE 7.—*Total case rates, hospital case rates, and percentage of cases hospitalized for 14 diagnoses among persons in broad age groups—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

[Sole, primary and contributory diagnoses]

Diagnosis	All ages [1]		Age—Under 5	Age—5–14	Age—15–44	Age—45 and over
	Number of cases	Total cases [2] per 1,000 population during year				
Tonsillectomy and adenoidectomy	841	21.9	27.0	44.1	12.5	4.5
Pneumonia, all forms	316	8.2	23.6	8.2	3.5	7.2
Other respiratory diseases	12,399	321.7	496.5	320.0	278.2	286.0
Appendicitis	352	9.1	1.5	8.2	14.2	3.8
Other digestive diseases	3,189	82.7	163.3	55 9	64.5	105.8
Accidents	2,889	75.0	70.9	85.9	71.4	69.7
Deliveries and abortions per 1,000 females	910	46.4	--------	--------	101.2	2 2
Female genital diseases and puerperal complications per 1,000 females	732	37.2	2.2	3.5	68.6	32.9
Degenerative diseases	1,430	37.1	9.4	11.6	31.2	125.6
Diseases of bones and joints, malformations and early infancy	349	9.1	17 4	7.5	6.7	10.6
Communicable diseases	3,697	95.9	237.3	179.1	26.7	16.0
Tuberculosis, all forms	182	4.7	2.2	5.8	5.5	3.1
Nervous and mental diseases	556	14.4	10.5	7.2	17 0	23 0
All other diseases	6,444	167.2	212.8	139 0	153.2	210.4
		Hospital cases [2] per 1,000 population during year				
Tonsillectomy and adenoidectomy	636	16.50	20 32	32.77	9.62	3.95
Pneumonia, all forms	50	1.30	3.81	1.17	.72	.86
Other respiratory diseases	113	2.93	2 72	2 04	3.23	3.95
Appendicitis	211	5.47	.54	4.47	8.84	2.23
Other digestive diseases	154	4.00	2.72	1.07	4.30	9.10
Accidents	209	5.42	3.45	5.25	5.74	6.36
Deliveries and abortions per 1,000 females	367	18.70	--------	--------	40.73	1.10
Female genital diseases and puerperal complications per 1,000 females	175	8.92	--------	.19	17.23	6 58
Degenerative diseases	160	4.15	.36	.78	4.18	13.74
Diseases of bones and joints, malformations and early infancy	65	1.69	6.17	1.36	.84	.52
Communicable diseases	81	2.10	2 36	3.31	1.67	1.03
Tuberculosis, all forms	62	1.61	1.27	1.56	2.03	.86
Nervous and mental diseases	62	1.61	.91	.97	1.79	2.75
All other diseases	316	8.20	12.52	5.54	7.77	9.79
		Percent of cases hospitalized				
Tonsillectomy and adenoidectomy	--------	75 6	75.2	74.4	76.7	88 5
Pneumonia, all forms	--------	15 8	16.2	14.3	20.7	11.9
Other respiratory diseases	--------	.9	.5	.6	1.2	1.4
Appendicitis	--------	59.9	(3)	54.8	62.4	59.1
Other digestive diseases	--------	4.8	1.7	1.9	6.7	8.6
Accidents	--------	7.2	4.9	6.1	8.0	9.1
Deliveries and abortions	--------	40.3	--------	--------	40.3	(3)
Female genital diseases and puerperal complications	--------	23.9	--------	5.6	25.1	20.0
Degenerative diseases	--------	11 2	3.8	6.7	13.4	10.9
Diseases of bones and joints, malformations and early infancy	--------	18.6	35.4	18.2	12.5	4.8
Communicable diseases	--------	2.2	1.0	1.8	6.3	6.5
Tuberculosis, all forms	--------	34 1	(3)	26.7	37.0	27.8
Nervous and mental diseases	--------	11.2	8.6	13.5	10.5	11.9
All other diseases	--------	4.9	5.9	4.0	5.1	4.7
		Population (years of life)				
Both sexes	--------	38,544	5,513	10,283	16,7 9	5,822
Females	--------	19,627	2,684	5,162	8,937	2,736

[1] All ages includes a few of unknown age.

[2] Total cases refer to disabling and nondisabling cases which lasted for 1 or more days, including cases with prior onset that extended into the study year. Hospital cases include any of these cases that were in a hospital for 1 night or longer during the study year.

[3] Less than 15 total cases and no percentage computed.

TABLE 8.—*Distribution according to diagnosis of hospital, bed, disabling, and sick cases and days—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

[Sole or primary diagnoses, except institutional cases and days [1]]

Diagnosis	Percentage due to each diagnosis							
	Hospital	Bed	Disabling	Sick [2]	Hospital	Bed	Disabling	Sick [2]
	All cases				All cases except minor respiratory and minor digestive diseases [3]			
All causes	100	100	100	100	100	100	100	100
Tonsillectomy and adenoidectomy	27.5	4.8	4.1	2.5	28.2	9.1	7.4	4.3
Pneumonia	1.5	1.6	1.4	.8	1.6	3.0	2.5	1.4
Minor respiratory diseases	1.5	40.2	38.3	34.7	-------	-------	-------	-------
Other respiratory diseases	1.9	2.1	2.2	2.6	1.9	4.0	4.0	4.5
Appendicitis	8.3	1.7	1.4	1.0	8.5	3.2	2.6	1.7
Minor digestive diseases	.8	6.8	6.6	7.1	-------	-------	-------	-------
Other digestive diseases	5.1	2.0	2.0	2.2	5.2	3.9	3.6	3.7
Accidents	9.0	5.2	7.0	8.8	9.3	9.8	12.7	15.1
Deliveries and abortions	16.1	5.4	4.6	2.8	16.5	10.2	8.3	4.8
Female genital diseases and pregnancy complications	5.5	1.9	1.7	1.9	5.6	3.6	3.1	3.3
Degenerative diseases	5.4	3.2	3.2	3.7	5.5	6.1	5.8	6.4
Diseases of bones and joints, malformations and early infancy	2.5	.6	.7	1.0	2.5	1.1	1.2	1.7
Communicable diseases	3.1	13.4	14.2	11.2	3.2	25.2	25.7	19.2
Tuberculosis, all forms	.8	.4	.4	.4	.9	.7	.7	.7
Nervous and mental diseases	.9	1.1	1.1	1.4	.9	2.0	2.0	2.5
All other diseases	9.9	9.6	11.3	17.8	10.2	18.1	20.6	30.6
Number of cases, all causes	2,268	16,639	19,798	32,663	2,215	8,814	10,913	19,009
	All days				All days except for minor respiratory and minor digestive diseases			
All causes	100	100	100	100	100	100	100	100
Tonsillectomy and adenoidectomy	4.5	2.1	2.6	7	4.6	2.8	3.4	.9
Pneumonia	2.2	3.4	2.5	7	2.2	4.5	3.2	.8
Minor respiratory diseases	1.2	22.5	19.2	11.5	-------	-------	-------	-------
Other respiratory diseases	1.1	1.9	2.2	4.8	1.1	2.5	2.8	5.7
Appendicitis	10.2	3.4	2.8	1.1	10.4	4.6	3.6	1.3
Minor digestive diseases	.6	3.0	2.9	4.0	-------	-------	-------	-------
Other digestive diseases	7.1	3.2	3.1	5.4	7.3	4.4	3.9	6.4
Accidents	11.4	6.5	8.3	5.4	11.6	8.7	10.6	6.4
Deliveries and abortions	16.9	8.0	5.4	1.6	17.2	10.7	6.9	1.9
Female genital diseases and pregnancy complications	6.6	3.0	2.5	4.9	6.8	4.0	3.2	5.8
Degenerative diseases	9.3	11.2	10.2	14.5	9.5	15.0	13.1	17.1
Diseases of bones and joints, malformations and early infancy	8.1	3.4	2.3	4.0	8.2	4.5	3.0	4.7
Communicable diseases	5.2	12.3	17.5	8.0	5.3	16.5	22.5	9.4
Tuberculosis, all forms	2.0	3.6	4.7	3.2	2.1	4.8	6.1	3.7
Nervous and mental diseases	1.7	2.4	2.9	4.4	1.7	3.2	3.8	5.2
All other diseases	11.8	10.2	10.9	25.8	12.0	13.7	14.0	30.6
Number of days, all causes	25,339	130,703	272,265	1,002,001	24,879	97,300	212,013	847,148

[1] Sixteen cases in hospitals throughout the study year and 73 other cases in mental and tuberculosis hospitals and other sanatoriums are excluded from all categories of cases and days.
[2] Sick cases and days refer to the total of disabling and nondisabling cases and days.
[3] Minor respiratory diseases include coryza and other colds, bronchitis, cough, influenza, grippe, tonsillitis, quinsy, diseases of the pharynx and larynx, croup, and other sore throat. Minor digestive diseases include indigestion, gastritis and the like, other minor stomach diseases, biliousness and diarrhea and enteritis.

quite different from that of total cases and also from the distributions of disabling and bed cases reported in the survey (table 8). As noted above, one of the major differences is the large proportion of minor respiratory and minor digestive diseases in the nonhospital case load which is almost absent from the hospital case load; these two diagnosis

groups make up 47 percent of the bed cases but only 2 percent of the hospital cases recorded in this study. Therefore, the diagnosis distribution of hospital cases was compared with total disabling and bed cases exclusive of minor respiratory and minor digestive diseases. But there are still large differences in the hospital and other data. Of the hospital cases, exclusive of minor respiratory and minor digestive diseases, tonsillectomy constitutes 28 percent, as against 9 percent of the bed cases, 7 percent of the disabling cases and 4 percent of the total cases recorded in the survey. Similarly, deliveries and abortions constitute 16 percent of the hospital cases, 10 percent of the bed cases, 8 percent of the disabling cases, but only 5 percent of the total cases. Accidents, however, constitute a larger percentage of total cases (15 percent) than of hospital cases (9 percent), but about the same percentage of bed (10 percent) as of hospital cases. Communicable diseases are a much larger proportion of nonhospital than of hospital cases, constituting 3 percent of the hospital cases, 25 percent of bed cases, and 19 percent of total cases, exclusive of minor respiratory and minor digestive diseases. Appendicitis is also more important in hospital practice, constituting 8 percent of hospital cases, 3 percent of bed cases, and 2 percent of total cases. To summarize, the diagnoses that loom larger in hospital practice than in the general sickness picture are tonsillectomy, deliveries, appendicitis, other major digestive diseases, female genital diseases, and malformations and diseases of early infancy; while the percentages are different for days of hospital, bed, and disabling illness for the various diagnoses, the data indicate that these same diagnoses are relatively more important with respect to days of sickness spent in the hospital than in the total illness picture.

IV. COMPARISON OF HOSPITALIZED ILLNESS AND GENERAL MORTALITY

It is hardly necessary to compare graphically the age curve of hospital cases with that of mortality from all cases: (*a*) death rates vary greatly with age, but hospital admission rates vary relatively little except for the large peak of deliveries among females of the childbearing ages, (*b*) death rates increase in old age much more rapidly than hospital admission rates, (*c*) death rates are higher in the youngest ages than among older children, but hospital admission rates in this study are higher at 5–9 years than among children under 5 years, (*d*) death rates for males are higher than those for females at every age group, but hospital admission rates for males are slightly lower than those for females when deliveries and female genital diseases are excluded.

Proportions of cases and deaths that are hospitalized.—When deaths for the surveyed population are considered, it is necessary to bring in data for families that were observed for only part of the study year. A death was frequently the reason that the family had to

be dropped from the study in that it often led to the break-up of the family or its removal to another locality. Even when the households observed for only part of the year are combined with the full-time group, there were only 295 deaths in the whole surveyed population. Of these deaths, 37.6 percent were hospital cases, as compared with 32.7 percent for all deaths in the United States in 1936 (*32*), the earliest available year.[27] In view of this moderate agreement it seems feasible to compare for specific diagnoses the percentages of cases that were hospitalized in the surveyed population with the percentages of deaths that occurred in hospitals in the total United States. Al-

NUMBER ALL CASES SURVEY	PER CENT IN HOSP. SURVEY DISAB.	TOTAL	U.S. DEATHS
323	85.7	58.2	81.5
179	27.6	13.6	68.6
101	71.2	46.5	68.5
76	34.0	21.1	64.1
962	40.1	38.9	59.8
191	40.0	32.5	53.6
130	53.6	40.0	46.4
45	52.4	24.4	44.0
2682	11.7	5.3	39.9
70	39.4	18.6	38.5
268	13.1	13.1	38.4
227	10.4	10.1	33.7
52	66.7	50.0	33.3
70	18.6	18.6	32.9
927	.3	.3	32.8
737	-	-	30.5
213	1.8	.9	29.5
130	4.3	1.5	28.8
519	1.7	1.0	26.1
383	5.3	2.8	24.3
68	12.5	8.8	21.5
284	10.6	6.7	20.4
51	23.8	19.6	19.0
3306	.7	.7	16.2
127	5.7	4.7	11.0

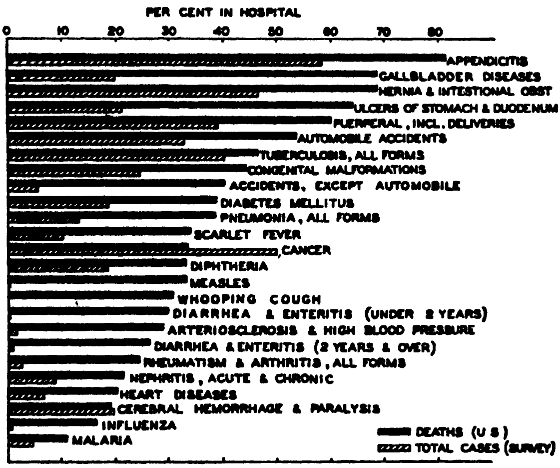

FIGURE 15.—Percentage of cases and of deaths that were hospital cases. (Sole or primary diagnoses with 45 or more total cases and 20 or more disabling cases in the family survey, 1928–31; deaths in the total United States, 1936; deaths in penal institutions are not counted as deaths in hospitals.)

though the comparison is a rough one, the data will help to indicate the kinds of cases that get into hospitals.

Of the total survey cases, 7.5 percent were hospitalized; of disabling cases 12.5 percent, and of the bed cases 14.9 percent were hospitalized, as compared with 37.6 percent of deaths for the survey and 32.7 for the total United States. Considering the specific causes shown in figure 15, it is seen that for every diagnosis except cancer and cerebral hemorrhage the percentage of deaths in hospitals was materially

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[27] Of the 88 deaths in the surveyed group from cardiovascular renal diseases, 20 percent were hospital cases, as compared with 21 percent for the United States; for all other causes the figures were 45 percent for the survey and 41 percent for the United States. Of the other specific causes of death, none had as many as 30 deaths in the surveyed group and the percentages would be unreliable.

The figures for the United States and the family survey both exclude deaths in institutions other than hospitals, such as jails, penitentiaries, and homes for the blind, deaf, and aged. A fatal hospital case in the survey means one that was in a hospital within the survey year but may have died after discharge from the hospital; the actual place of death was not available but it may be assumed that most of such cases died in hospitals.

The percentage of deaths that occurred in hospitals (public general) of Ontario, Canada (*31*), is available back to 1900. In that year 5.0 percent of all deaths occurred in these hospitals; in 1910, 10.0 percent; in 1920, 16.5 percent; in 1930, 29.5 percent; in 1936, 29.7 percent; and in 1938, 31.5 percent.

larger than the percentage of the total cases. Although the excess in the percentage for deaths over that for cases is large for most of the diagnoses, it is less for appendicitis, hernia, and tuberculosis than for other causes. Measles, whooping cough, and diarrhea and enteritis show very small percentages of cases hospitalized, but 26 to 33 percent of the deaths were in hospitals.

Although not shown graphically, there is given at the left of the chart the percentage of disabling cases of each diagnosis that were hospitalized. These percentages more nearly approximate those for deaths, but for most of the diagnoses the proportion of deaths in hospitals is larger than the proportion of disabling cases that were hospitalized. Thus, the data for specific causes indicate that hospital cases include larger proportions of the severe cases that terminate fatally.

Surgical and nonsurgical treatment in relation to hospitalization and case fatality.—No data are available on deaths among surgical and nonsurgical patients in all hospitals in the United States. However, the 295 deaths in the surveyed population can be classified according to the type of treatment received. Table 9 shows by sex and age the proportions of surgical and nonsurgical fatal cases that had been in a hospital. Of the 38 deaths of surgically treated patients 95 percent had been hospitalized, but of the 257 deaths of nonsurgical patients only 29 percent had been hospitalized. The much higher percentages hospitalized among fatal surgical cases is true of both males and females and for the three age groups, although the numbers involved are very small. Of the total surgical cases, 60 percent were hospitalized, but of the fatal surgical cases 95 percent were hospitalized. Thus the factor of severity plus the indication that surgery is required brings practically all such cases to the hospital.

TABLE 9.—*Percentage of all fatal cases (deaths) from all causes that were hospital cases—295 deaths among 42,780 years of life for canvassed white families in 18 States during 3 to 12 consecutive months, 1928–31*

Type of case	Percentage of fatal cases (deaths) that were hospital cases						Total number of all fatal cases (deaths)				
	All ages			Both sexes			All ages [1]		Both sexes		
	Both sexes	Male	Female	Under 20	20-44	45 and over	Male	Female	Under 20	20-44	45 and over
All fatal cases	37.6	43.5	30.6	41.8	58.0	28.5	161	134	98	50	144
Fatal surgical cases	94.7	95.0	94.5	90.0	100.0	94.1	20	18	10	11	17
Fatal nonsurgical cases	29.2	36.2	20.7	36.4	46.2	19.7	141	116	88	39	127

[1] All ages includes 3 deaths of nonsurgical patients of unknown age; 4 deaths of unknown sex (under 1 year) were allocated 2 to male and 2 to female; 1 death of unknown sex and age was allocated to female.

Table 10 shows the percentage of surgical and nonsurgical hospital cases in this study that terminated fatally. Among the 2,623 hos-

TABLE 10.—*Percentage of hospital cases that were fatal—2,623 hospital cases among 42,750 years of life for canvassed white families in 18 States during 3 to 12 consecutive months, 1928–31*

Type of case	All ages[1]				Both sexes, all causes				
	All causes			Female, all except genital and puerperal	Under 5	5–19	20–44	45–64	65 and over
	Both sexes	Male	Female						
	Percentage of hospital cases that were fatal								
Total	4.2	7.0	2.5	3.4	7.7	2.3	2.4	7.3	29.1
Surgical	2.3	2.8	1.8	2.0	2.0	.8	1.8	5.7	20 0
Nonsurgical	7.3	15.9	3.4	6.8	18.6	7.3	3.1	9.4	38.5
	Total number of hospital cases								
Total	2,623	994	1,629	1,099	298	787	1,194	247	79
Surgical	1,599	674	925	767	196	609	605	141	40
Nonsurgical	1,024	320	704	323	102	178	589	106	39

[1] All ages includes a few of unknown age; 4 cases (2 fatal) under 1 year of age and of unknown sex were allocated equally to male and female; 1 nonfatal case 45–64 years of age and of unknown sex was allocated to female

pitalized cases for the full- and part-time families, 4.2 percent terminated fatally either in the hospital or within the study year after being discharged from the hospital. Among males 7.0 percent terminated fatally as compared with figures for females of 2.5 percent for all causes and 3.4 percent for all except female genital and puerperal diagnoses. Among the 1,599 hospital surgical cases, 2.3 percent terminated fatally, but of the 1,024 nonsurgical cases 7.3 percent terminated fatally. In each of the age and sex groups shown in table 10 a smaller percentage of surgical than of nonsurgical cases terminated fatally. It should be noted that these case fatalities for hospital cases are not comparable with those for all cases because hospital admissions represent a selected group of severe cases with more than the average probability of dying.

V. DISTRIBUTION OF CASES BY DAYS OF HOSPITAL CARE

The distribution of cases according to the days of hospital care is of interest. Although the cases in this study include some carried over from the preceding year, the number may be assumed to be small; in the tables that follow this carry-over is disregarded and the days within the study year are used for all cases, except that year-long cases are excluded from certain tables.

Table 11 shows hospital cases and rates for all causes by single days of duration up to 45 days. Cases in the hospital for only one day amount to 14.2 per 1,000 population or nearly one-fourth of all hospital cases; 2-day cases with 5.4 per 1,000 have the second highest

TABLE 11.—*Hospital admission rates during year* [1] *for cases classified by days of hospital stay, and the annual days of hospital care resulting from cases contributing a specified number of days* [2] *t or less—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

[Sole or primary diagnoses; 38,544 years of life]

Hospital days (t)	All causes				Annual number of days of hospital care resulting from cases contributing t days or less, per 1,000 population		
	Admissions with the specified number of hospital days (t)		Admissions with the specified number of hospital days (t) or more		All causes	All causes except mental and nervous diseases and tuberculosis	All causes except mental and nervous diseases, tuberculosis, deliveries, and abortions
	Number	Annual rate per 1,000 population	Number	Annual rate per 1,000 population			
1	548	14.22	2,341	60.74	61	58	49
2	208	5.40	1,793	46.52	107	103	84
3	101	2.62	1,585	41.12	148	141	113
4	96	2.49	1,484	38.50	187	178	140
5	70	1.82	1,388	36.01	223	212	165
6	55	1.43	1,318	34.19	257	244	189
7	89	2.31	1,263	32.77	290	274	211
8	60	1.56	1,174	30.46	320	303	231
9	55	1.43	1,114	28.90	349	330	250
10	192	4.98	1,059	27.48	377	356	269
11	62	1.61	867	22.49	399	376	285
12	106	2.75	805	20.89	420	395	301
13	46	1.19	699	18.14	438	412	314
14	182	4.72	653	16.94	455	427	326
15	35	.91	471	12.22	467	438	338
16	24	.62	436	11.31	479	447	347
17	20	.52	412	10.69	489	457	355
18	21	.54	392	10.17	500	465	363
19	14	.36	371	9.63	509	473	371
20	12	.31	357	9.26	518	481	378
21	64	1.66	345	8.95	527	489	385
22	11	.29	281	7.29	535	494	391
23	6	.16	270	7.00	542	500	396
24	13	.34	264	6.85	549	505	401
25	6	.16	251	6.51	555	511	406
26	6	.16	245	6.36	561	516	411
27	8	.21	239	6.20	568	520	415
28	30	.78	231	5.99	574	525	420
29	7	.18	201	5.21	579	529	424
30	20	.52	194	5.03	584	533	427
31	2	.05	174	4.51	588	536	430
32	6	.16	172	4.46	593	540	433
33	2	.05	166	4.31	597	543	436
34	4	.10	164	4.25	601	546	439
35	15	.39	160	4.15	606	549	442
36	1	.03	145	3.76	609	551	445
37	1	.03	144	3.74	613	554	447
38	2	.05	143	3.71	617	556	449
39	3	.08	141	3.66	620	559	452
40	2	.05	138	3.58	624	561	454
41	1	.03	136	3.53	627	564	456
42	9	.23	135	3.50	631	566	458
43	4	.10	126	3.27	634	568	461
44	2	.05	122	3.17	637	570	462
45	5	.13	120	3.11	641	572	464

[1] Cases with onset of symptoms prior to the study year are included. The date of admission to the hospital was not recorded; although 10 percent of the 2,341 hospital cases had a prior onset of symptoms, the number with prior hospitalization would be much less. Also some cases with onset within were still sick at the end of the year, but they were not necessarily still in the hospital. Sixty-three cases in the hospital an unknown number of days were put in at the average for known cases of the same diagnosis; inasmuch as the unknowns were scattered among 22 separate diagnoses they fell into the distribution in various places and would not affect the result in any material way. The only cases omitted are the 16 recorded as in the hospital throughout the study year.

[2] Includes days of care from the 1st to the t^{th} day in the hospital, or to the day of discharge if earlier, re-

rate. There are large peaks in the cases at 10, 12, 14, 21, and 28 days which should be heavily discounted because of the tendency of the housewife to report durations in round numbers or in weeks. However, a tabulation of data from the records of nine Baltimore hospitals (*22*) indicates that there are considerably more hospital cases with durations for each of 9, 10, and 11 days than for any other single day of duration above 3 days. Deliveries account for this peak and when they are excluded, there is a fairly gradual decline in the

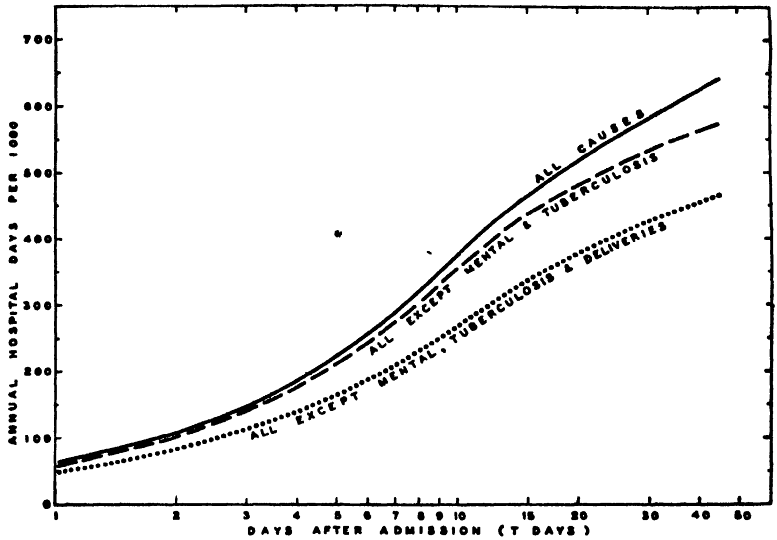

FIGURE 16.—Annual days of hospital care from day of admission through the indicated day after admission per 1,000 population—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Includes days of care from the 1st to the t^{th} day in the hospital, or to the day of discharge if earlier, regardless of the total hospital duration of the case. See table 11 for further details. Horizontal scale is logarithmic.)

number of cases as duration increases, with only small peaks at 19 to 21 and 28 days.

Table 11 also shows days of hospital care per 1,000 persons which pertain to cases of certain durations. In figure 16 the data are plotted in a way to show the days of hospital care pertaining to cases contributing a given number of days or less. For example, the figure plotted for 21 days refers to the days of hospital care accruing from the first to the twenty-first day of hospitalization for each case (or from the first day until discharge if that occurred earlier). Thus, if the figure plotted for 2 days be subtracted from that for 21 days, the result is the days of hospital care accruing from the third to the twenty-first day of hospitalization for each case.[23]

[23] This type of chart with a logarithmic horizontal scale was used by Perrott (*23*) and Gafafer (*25, 26*) in showing similar data for days of disability.

TABLE 12.—*Mean days per hospital case and the distribution of cases according to days in the hospital—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

Diagnosis	Cases with only 1 diagnosis (uncomplicated)															Cases with 2 or more diagnoses (complicated)[1]			
	Total number of cases	Percent in hospital	Mean hospital days per hospital case	Number of hospital cases with known hospital days	Percent of hospital cases that were in the hospital the specified number of days within the study year											Total number of cases	Percent in hospital	Mean hospital days per hospital case	Number of hospital cases with known hospital days
					All hospital cases	1	2	3	4–5	6–8	9–11	12–17	18–24	25–45	46–365				
All causes	31,344	6.7	15.0	2,033	100	25.8	9.2	4.3	6.4	8.5	13.7	16.9	5.8	4.6	4.9	[1] 1,408	18.7	20.5	[1] 261
Tonsillectomy and adenoidectomy	791	75.6	1.7	590	100	68.0	21.4	4.4	3.4	1.2	.5	.8	.2	.2	------	50	76.0	6.0	37
Other respiratory diseases	11,894	.7	10.8	80	100	10.0	6.3	13.7	16.3	12.5	11.3	15.0	8.7	3.7	2.5	821	9.7	21.6	79
Appendicitis	291	55.3	13.0	161	100	1.9	1.2	------	1.9	13.7	25.5	41.0	8.7	6.2	------	61	82.0	17.5	50
Other digestive diseases	2,906	3.7	14.2	108	100	5.6	3.7	2.8	6.5	9.3	13.0	28.7	20.4	9.3	.9	283	16.3	17.3	46
Accidents	2,837	6.7	13.0	183	100	26.8	7.7	8.2	8.7	12.0	7.7	13.1	4.4	5.5	6.0	52	36.5	29.0	19
Deliveries and abortions	871	39.5	11.0	339	100	.6	2.4	.9	5.0	9.1	45.1	32.4	2.9	.9	.6	39	59.0	22.7	23
Female genital and puerperal complications	574	16.9	12.3	97	100	6.2	2.1	4.1	13.4	14.4	10.3	25.8	16.5	6.2	1.0	168	49.4	18.5	78
Degenerative diseases	1,020	9.4	21.6	94	100	13.8	5.3	6.4	4.3	13.8	6.4	14.9	9.6	12.8	12.8	410	15.9	21.6	63
Diseases of bones and joints, malformations and early infancy	317	16.1	46.2	48	100	4.2	6.3	2.1	2.1	6.3	8.3	20.8	6.3	12.5	31.3	32	43.7	40.8	14
Communicable diseases	3,514	1.7	19.7	60	100	8.3	6.7	8.3	5.0	5.0	8.3	16.7	8.3	26.7	6.7	183	12.0	25.4	21
Tuberculosis, all forms	154	31.2	115.5	42	100	4.8	------	2.4	2.4	9.5	------	2.4	4.8	11.9	61.9	28	50.0	45.6	13
Nervous and mental diseases	478	8.4	98.6	33	100	------	3.0	6.1	6.1	3.0	6.1	21.2	3.0	12.1	39.4	78	28.2	40.9	21
Ear and mastoid diseases	695	5.9	8.3	41	100	7.3	9.8	7.3	22.0	14.6	17.1	7.3	14.6	------	------	212	10.4	14.0	22
All other diseases	5,002	3.5	17.1	157	100	15.9	5.7	5.1	13.4	17.2	6.4	15.9	8.3	4.5	7.6	535	14.0	12.9	76

[1] Complicated cases of a given diagnosis include both primary and contributory causes; however, the figure for all causes is a total of primary causes only, since that counts each case once and only once.

Days of hospital care for all cases contributing 21 days or less (first to twenty-first day or to discharge if earlier) amounted in this study to 527 days per 1,000 population for all cases except those hospitalized throughout the study year, 489 for all except mental and nervous diseases and tuberculosis, and 385 for all except mental and nervous diseases, tuberculosis, deliveries, and abortions. However, hospital admission rates in this study are considerably less than in hospital insurance plans.

Table 12 shows for each of 14 diagnoses the average hospital days per hospital case for uncomplicated and complicated cases (two or more diagnoses). For 9 of the 14 diagnoses the average days in the hospital are materially greater for cases complicated by another disease than for those with only a single diagnosis. For the diseases of greater severity (tuberculosis, mental and nervous diseases, bone and joint diseases, malformations and diseases of early infancy, degenerative diseases) the average durations for cases with two or more diagnoses were no greater than for cases with only a single diagnosis.

For all causes of illness, 7 percent of the cases with only one diagnosis were hospitalized with an average stay of 15 days per hospital case, as compared with 19 percent of the complicated cases with 20 days per hospital case. More careful and complete diagnosis of hospital than of nonhospital cases would make for more hospital cases with two or more diagnoses and thus increase the percentages of complicated cases recorded as hospitalized; however, the average duration per hospital case seems free from this bias. Thus, the presence of a second diagnosis usually means a longer average stay in the hospital.

Table 12 also shows the distribution of uncomplicated cases according to the number of days in the hospital. Because the durations were those reported by the household informant, they tend to be remembered in weeks and round numbers, such as 5, 7, 10, 14, 21, etc.; the rather peculiar class intervals in the table are arranged to put these values near the centers of the classes. Considering all causes of illness, 26 percent of the uncomplicated hospital cases were in the hospital for only 1 day and another 20 percent for 1 to 5 days, with only 5 percent staying as long as 46 days during the study year. Of the cases of tonsillectomy, 68 percent were in the hospital for only 1 day and another 21 percent for 2 days, with only 11 percent staying as long as 3 days. Twenty-seven percent of the accident cases were in the hospital for only a single day but about half the cases were in the hospital for 6 days or longer. Of the uncomplicated deliveries 45 percent were in the hospital from 9 to 11 days and another 32 percent from 12 to 17 days. Thus, these cases show less than the average variability in the length of hospital stay.

VI. TYPE OF HOSPITAL, ACCOMMODATIONS, AND PUBLIC CLINIC SERVICE

Of the 2,285 cases among the 8,758 families observed for a full year which were admitted to hospitals other than those for tuberculosis and mental diseases, 88 percent were in general hospitals, as compared with 90 percent in the report of the American Medical Association (table 13); admissions to eye-ear-nose-throat, women's, children's, and communicable disease hospitals make up another 7 percent in the survey data, as compared with 5 percent in the American Medical Association data; other hospitals, except tuberculosis and mental, account for 5 percent of the admissions in both the survey and the American Medical Association data.

TABLE 13.—*Percentage of hospital cases that were admitted to each type of hospital—2,357 hospital cases among 8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

Kind of hospital	Percentage of admissions to each type of hospital, including mental and tuberculosis hospitals				Percentage of admissions to each type of hospital, excluding mental and tuberculosis hospitals			
	Total U.S., 1932[1]	Surveyed families, 1928–31			Total U.S., 1932[1]	Surveyed families, 1928–31		
	All cases	All cases	Surgical	Nonsurgical	All cases	All cases	Surgical	Nonsurgical
All hospitals, number of cases	7,228,151	2,357	1,452	905	6,965,188	2,285	1,452	833
All hospitals, percent	100	100	100	100	100	100	100	100
General	87.2	85.2	92.0	74.1	90.5	87.9	92.0	80.6
Eye, ear, nose, and throat	1.6	7	1.2	---	1.7	7	1.2	---
Women's	1.3	2.7	.6	6.1	1.3	2.8	.6	6.6
Children's	1.2	2.1	1.8	2.7	1.2	2.1	1.8	2.9
Tuberculosis	1.3	1.8	--------	4.8	--------	------	--------	------
Mental and nervous	2.3	1.2	------	3.2	------	-	--------	----
Communicable disease	.6	1.1	1	2.9	.6	1.2	.1	3.1
All other	4.5	5.1	4.4	6.3	4.7	5.3	4.4	6.8

[1] Registered hospitals in the United States as reported in the Hospital number of the Journal of the American Medical Association (27)

Of the hospital surgical cases in the survey, 92 percent were in general hospitals as compared with 81 percent of the nonsurgical cases, exclusive of those in tuberculosis and mental hospitals; larger percentages of nonsurgical than of surgical cases were in each of the special types of hospitals except those for eye, ear, nose and throat cases.

Of the total hospital cases, 36 percent were in wards, 22 percent in semiprivate rooms, and 42 percent in private rooms. Forty percent of the 905 nonsurgical cases were in wards as compared with 34 percent of the 1,452 surgical cases.

Of the total hospital cases, 10.4 percent had some public clinic or out-patient service also, including that rendered by the same hospital and by other public and hospital clinics; this figure may be compared with 4.8 percent for all attended cases (hospital and nonhospital). Of the hospital surgical cases 8.1 percent had some public clinic service as compared with 14.0 percent for all hospital nonsurgical

cases and 13.0 percent for all except those in tuberculosis and mental hospitals. Of the cases in general hospitals, 9.3 percent had public clinic service—7.9 percent for surgical cases and 11.9 percent for nonsurgical cases. In women's hospitals, 22 percent of the 63 cases had public clinic service, in children's hospitals 14 percent of the 49 cases, and in tuberculosis hospitals 44 percent of the 43 cases had public clinic service.

Among ward patients, 22.1 percent had some public clinic service, as compared with 7.9 percent of those in semiprivate rooms and 0.8 percent of those in private rooms.

VII. SUMMARY

Data on the frequency of illness and hospital care were recorded for a 12-month period between 1928 and 1931 by periodic canvasses of 8,758 white families in 130 localities in 18 States. The surveyed families include representation from nearly all geographic sections, from rural, urban, and metropolitan areas, from all income classes and of both native- and foreign-born persons. Visits were made at intervals of 2 to 4 months. Illnesses causing symptoms for one day or longer were recorded, together with the number of cases that were hospitalized and the days of hospital care within the study year.

There were during the year 61.6 hospital cases and 886 hospital days per 1,000 persons under observation, exclusive of cases in institutions throughout the study year. The average stay in the hospital was 14.4 days per case. Of the total illnesses, 7.5 percent were hospitalized. Of the illnesses causing inability to work or pursue other usual activities, 12.5 percent were hospitalized, and of the total disabled days 11.8 percent were spent in a hospital. Of the cases that confined the patient to bed for one or more days 14.9 percent were hospitalized, and 23.4 percent of the days in bed were hospital days.

Hospital admission rates varied relatively little with age except for a large peak for females of the childbearing ages when deliveries are an important cause of hospitalization. There is not much difference between hospital rates for males and females when the comparison is limited to diagnoses common to both sexes (fig. 1).

Of all hospital cases 22 percent had the exclusive services of a special private duty nurse for one or more of the days or nights in the hospital. Of the cases with such a nurse, 35 percent had two or more nurses during at least one 24-hour day. Fourteen percent of the hospital days were days with a special nurse for the day or night or both.

Five specific diagnoses stand out as extremely important in hospital practice, namely, tonsillectomy, deliveries, accidental injuries, appendicitis, and female genital diseases. Tonsillectomy is less important in days of hospital care but the other diagnoses are important both in admissions and days. The five specific diagnoses with the highest

percentages of cases hospitalized were tonsillectomy 76 percent, mastoid diseases 73 percent, tumors of the female genital organs 67 percent, appendicitis 60 percent, and salpingitis and pelvic abscess 59 percent. In general a higher percentage of cases of corresponding diagnoses were hospitalized among males than females.

Of the total hospital cases 62 percent were surgical and the other 38 percent nonsurgical. Among hospital cases exclusive of those in mental and tuberculosis hospitals and other sanatoriums, surgical cases were more frequent than nonsurgical in every age group except 20 to 34 years for women when deliveries are an important cause of hospital care. The largest excess for surgical cases is at 5–9 years when tonsillectomy is frequent (fig. 8). Sixty percent of all surgical cases reported in the study were hospitalized, but only 3 percent of the nonsurgical cases. Ninety percent or more of the surgical cases of hernia, gall bladder diseases, thyroid diseases, appendicitis, mastoid diseases, and salpingitis and female genital tumors were hospitalized, but none of these diagnoses had more than 15 percent of the nonsurgical cases hospitalized and only one had more than 8 percent (fig. 11). Thus hospitals get disproportionately large numbers of surgical cases.

The relative age curves for males and females for all illnesses recorded in the survey are quite different from the corresponding curves of hospital cases. The curves for all surgical cases are fairly similar to corresponding curves for hospital surgical cases, but those for nonsurgical cases are radically different. The relative age curves for all bed cases except minor respiratory and minor digestive diseases are more similar to those for hospital cases, the chief difference being that bed cases among females show an excess over males for diagnoses common to the two sexes but hospital cases show little excess of this kind (figs. 12 and 13).

The relative age curves of specific diseases that are important in hospital practice are generally similar for total and hospital cases (fig. 14). But the distribution according to diagnosis of the hospital case load is radically different from similar distributions of total disabling and bed cases recorded in the survey, even when minor respiratory and minor digestive cases are eliminated.

Roughly one-third of the fatal cases (deaths) are hospitalized but only one-tenth to one-fifteenth of all cases. This difference shows up for nearly every diagnosis but is most marked for the communicable diseases of childhood and for diarrhea and enteritis. Thus hospitals get disproportionately large numbers of the severest types of cases.

Hospital case fatality (deaths per 100 hospital cases) was consistently less in the different age groups for surgical than for nonsurgical cases.

Days of hospital care for all cases contributing 21 days or less (first to twenty-first day or to discharge if earlier) amounted to 527

days per 1,000 population for all cases except those hospitalized throughout the study year, 489 for all except mental and nervous diseases and tuberculosis, and 385 for all except mental and nervous diseases, tuberculosis, and deliveries and abortions. However, hospital admission rates in this study were considerably less than in hospital insurance plans.

VIII. REFERENCES

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PUBLIC HEALTH SERVICE PUBLICATIONS

A List of Publications Issued During the Period January–June 1942

The following is a list of publications of the United States Public Health Service issued during the period January–June 1942.

The purpose of the publication of this list is to provide a complete and continuing record of Public Health Service publications, for reference use by librarians, scientific workers, and others interested in particular fields of public health work, and not to offer the publications for indiscriminate free public distribution.

Those publications marked with an asterisk (*) may be obtained only by purchase from the Superintendent of Documents, Government Printing Office, Washington, D. C., at the prices noted.

Periodicals

*Public Health Reports (weekly), January–June, vol. 57, Nos. 1 to 26, pages 1 to 986. 5 cents a number.

*Venereal Disease Information (monthly), January–June, vol. 23, Nos. 1 to 6, pages 1 to 248. 5 cents a number.

*Journal of the National Cancer Institute (bimonthly), February–April, vol. 2, Nos. 4 and 5, pages 309 to 530. 40 cents a number.

Reprints From the Public Health Reports

2345. Disease outbreaks from water, milk, and other foods in 1939 By A. W. Fuchs. November 28, 1941. 8 pages.

2346. The coding and tabulation of medical and research data for statistical analysis. By Thomas I. Edwards. January 2, 1942. 14 pages.
2347. Antitularemic serum. By Edward Francis and Lloyd D. Felton. January 9, 1942. 12 pages.
2348. Distribution of health services in the structure of State government. Chapter III. Tuberculosis control by State agencies. By Joseph W. Mountin and Evelyn Flook. January 16, 1942. 26 pages.
2349. Isolation of coccidioides from soil and rodents. By C. W. Emmons. January 23, 1942. 3 pages.
2350. Studies on the duration of disabling sickness. III. Duration of disability from sickness and nonindustrial injuries among the male employees of an oil refining company with particular reference to the older worker, 1933–39, inclusive. By William M. Gafafer, Rosedith Sitgreaves, and Elizabeth S. Frasier. January 23, 1942. 14 pages.
2351. The incidence of cancer in Dallas and Fort Worth, Texas, and surrounding counties, 1938. By Arthur J. McDowell. January 23, 1942. 15 pages.
2352. Nutritional deficiency and infection. I. Influence of riboflavin or thiamin deficiency on fatal experimental pneumococcal infection in white mice. By Jerald G. Wooley and W. H. Sebrell. January 30, 1942. 13 pages.
2353. The present status of full-time local health organization. By F. W. Kratz. February 6, 1942. 2 pages.
2354. The occurrence of hyaline sclerosis and calcification of blood vessels in rats on sulfaguanidine. By Floyd S. Daft, L. L. Ashburn, Samuel S. Spicer, and W. H. Sebrell. February 13, 1942. 2 pages.
2355. Dental status of adult male mine and smelter workers. By H. P. Brinton, D. C. Johnston, and E. O. Thompson. February 13, 1942. 11 pages.
2356. Report on market-milk supplies of Standard Milk Ordinance communities. January 1, 1940–December 31, 1941. February 13, 1942. 6 pages.
2357. Diphtheria toxoid treatment of leprosy. A preliminary report. By G. H. Faget and F. A. Johansen. February 20, 1942. 5 pages.
2358. The effects of distillery wastes and waters on the microscopic flora and fauna of a small creek. By James B. Lackey. February 20, 1942. 8 pages.
2359. An appraisal technique for urban problem areas as a basis for housing policy of local governments. Illustrative results from three test surveys. A report of the Subcommittee on Appraisal of Residential Areas, Committee on the Hygiene of Housing, American Public Health Association. February 27 and April 3, 1942. 28 pages.
2360. Pathologic histology in guinea pigs following intraperitoneal inoculation with the virus of "Q" fever. By R. D. Lillie. February 27, 1942. 11 pages; 1 plate.
2361. Directory of full-time local health officers, 1942. March 6, 1942. 33 pages.
2362. The incidence of cancer in Birmingham and Jefferson County, Alabama, 1938. By Herbert J. Sommers. March 13, 1942. 21 pages.
2363. A summary of census data on sewerage systems in the United States. March 20, 1942. 13 pages.
2364. Milk control in the defense program. By A. W. Fuchs. March 20, 1942. 10 pages.
2365. Observations on experimental malaria control drainage ditch linings. By J. L. Robertson, Jr., J. A. LePrince, H. A. Johnson, and W. V. Parker. March 27, 1942. 13 pages; 8 plates.
2366. Histogenesis and repair of the hepatic cirrhosis in rats produced on low protein diets and preventable with choline. By R. D. Lillie, L. L. Ashburn, W. H. Sebrell, F. S. Daft, and J. V. Lowry. April 3, 1942. 7 pages.

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2367. Studies of the acute diarrheal diseases. VI. New procedures in bacteriological diagnosis. By Albert V. Hardy and Thelma DeCapito. VII. Carriers of *Shigella dysenteriae*. By James Watt, Albert V. Hardy, and Thelma DeCapito. VIII. Sulfaguanidine in the control of *Shigella dysenteriae* infections. By Albert V. Hardy, James Watt, Jerome Peterson, and Elise Schlosser. April 10, 1942. 15 pages.

2368. Administrative organization for mental hygiene. By Victor H. Vogel. April 10, 1942. 6 pages.

2369. Distribution of health services in the structure of State government. Chapter IV. Venereal disease control by State agencies. By Joseph W. Mountin and Evelyn Flook. April 17, 1942. 26 pages.

2370. A new base for the protective ointment for the prevention of poison ivy dermatitis. By Louis Schwartz, John E. Dunn, and F. H. Goldman. April 17, 1942. 10 pages.

2371. Cadmium poisoning. Prepared by Division of Industrial Hygiene, National Institute of Health. April 24, 1942. 12 pages.

2372. An epidemic of boils in a group of tunnel workers. By James Q. Gant, Robert J. Owens, and Louis Schwartz. April 24, 1942. 5 pages.

2373. Frequency and duration of disabilities causing absence from work among the employees of a public utility, 1938–41. By W. M. Gafafer. April 24, 1942. 4 pages.

2374. The story of the National leprosarium (U. S. Marine Hospital), Carville, Louisiana. By G. H. Faget. May 1, 1942. 12 pages; 2 plates.

2375. Anaphylaxis in guinea pigs following sensitization with chick-embryo yellow fever vaccine and normal chick embryos. By T. O. Berge and M. V. Hargett. May 1, 1942. 16 pages.

2376. Health agencies—their responsibilities and their opportunities during the present crisis. By Paul V. McNutt. May 8, 1942. 8 pages.

2377. The use of mucin in experimental infections of mice with *Vibrio cholerae*. By James J. Griffitts. May 8, 1942. 3 pages.

2378. Prevalence of poliomyelitis in the United States in 1941. By C. C. Dauer. May 8, 1942. 8 pages.

2379. An epidemiological study of poliomyelitis in Mississippi in 1941. By L. L. Lumsden. May 15, 1942. 25 pages.

2380. Five fumigants for disinfestation of bedding and clothing: a comparative study of insecticidal properties. By G. C. Sherrard. May 15, 1942. 7 pages.

2381. Domestic water and dental caries. IV. Effect of increasing the fluoride content of a common water supply on the *Lactobacillus acidophilus* counts of the saliva. Preliminary report. By Francis A. Arnold, Jr., H. Trendley Dean, and Elias Elvove. May 22, 1942. 8 pages.

2382. Housing of health departments. By Joseph W. Mountin. May 22, 1942. 9 pages.

2383. Clothing for protection against occupational skin irritants. By Louis Schwartz, Leon H. Warren, and Frederick H. Goldman. June 28, 1940. 6 pages; 2 plates.

2384. National Health Survey. List of publications. May 29, 1942. 8 pages.

2385. An analysis of industrial hygiene activities in State and local health departments, 1940–41. By V. M. Trasko and J. J. Bloomfield. June 5, 1942. 20 pages.

2386. Distribution of health services in the structure of State government. Chapter V. Sanitation by State agencies. By Joseph W. Mountin and Evelyn Flook. June 12 and 19, 1942. 50 pages.

Public Health Bulletins

277. Health and working environment of nonferrous metal mine workers. By Waldemar C. Dreessen, Richard T. Page, J. Walter Hough, Victoria M. Trasko, J. L. Jones, and R. W. Franks. 1942. 110 pages; 4 halftones.

National Institute of Health Bulletin

178. Index to the literature of *Siphonaptera* of North America. By Wm. L. Jellison and Newell E. Good. 1942. 193 pages.

Workers Health Series

6. Bill gets the works. 1942. 12 pages.

Unnumbered Publications

Index to Public Health Reports, volume 56, part 2, July-December 1941. 19 pages.

National Negro Health Week bulletin. This pamphlet is published annually, usually about the middle of March, for community leaders in an effort to suggest ways and means by which interested individuals and organizations may be organized for a concerted and effective attack upon the community's disease problems. Twenty-eighth observance, April, 5-12, 1942. 4 pages.

National Negro Health Week leaflet. Twenty-eighth observance, April 5-12, 1942. 2 pages.

National Negro Health Week poster. Twenty-eighth observance, April 5-12, 1942.

Reprints From Venereal Disease Information

165. The social worker and the nurse in genitoinfectious disease control. By Lena R. Waters. Vol. 22, November 1941. 7 pages.
166. Sulfathiazole treatment of gonococcal infection in 360 patients. By J. F. Mahoney, C. J. Van Slyke, and R. R. Wolcott. Vol. 22, December 1941. 7 pages.
167. Toxic dose of mapharsen given in interrupted doses. By Harold J. Magnuson and B. O. Raulston. Vol. 22, December 1941. 5 pages.
168. Syphilis study project Logan County, West Virginia. By N. B. Hon and William P. Hamilton. Vol. 23, January 1942.
169. Role of open houses of prostitution in spread of venereal diseases in a cantonment area. By Bascom Johnson, Jr. Vol. 23, January 1942. 7 pages.
170. Syphilis in Selective Service registrants determination of prevalence and plan of rehabilitation of proven cases. By Robert Dyar. Vol. 23, February 1942. 8 pages.
171. Sulfonamides and fever therapy in the treatment of gonorrhea in the male. By J. A. Trautman. Vol. 23, February 1942. 6 pages.
172. Storage of syphilitic serums. By Ruth M. Myers and C. A. Perry. Vol. 23, February 1942. 4 pages.
173. The private physician today in the control of the venereal diseases. By Frank H. Lahey. Vol. 23, March 1942. 3 pages.
174. The management of gonorrhea in general practice. The Executive Committee of the American Neisserian Medical Society. Vol. 23, March 1942. 15 pages.
175. The Mazzini microscopic flocculation test for syphilis. By L. Y. Mazzini. Vol. 23, April 1942. 8 pages.

176. Syphilis control in a State prison. I. Plan for treatment. By Bernard I. Kaplan and Charles C. Sweet. II. Role of prison in effecting adequate treatment. By Bernard I. Kaplan and I. Jay Brightman. Vol. 23, April 1942. 7 pages.
177. Studies in the epidemiology of syphilis. V. Methods of contact investigation. By Anne Sweeney. Vol. 23, April 1942. 7 pages.
179. A statement on prostitution in venereal disease control. By John H. Stokes. Vol. 23, May 1942. 4 pages.

Venereal Disease Bulletin

95. It doesn't pay. 1942. 21 pages.

INCIDENCE OF HOSPITALIZATION, AUGUST 1942

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 8,000,000 members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service. The data cover about 60 hospital service plans scattered throughout the country, mostly in large cities.

Item	August— 1942	August— 1941
1. Number of plans supplying data	63	48
2. Number of persons eligible for hospital care	8,889,867	5,663,760
3. Number of persons admitted for hospital care	91,467	58,033
4. Incidence per 1,000 persons, annual rate, during current month (daily rate x 365)	121 1	120.6
5. Simple average of annual rates for the 12 months ended Aug. 31	107 4	

DEATHS DURING WEEK ENDED SEPTEMBER 12, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 12, 1942	Corresponding week 1941
Data from 86 large cities of the United States:		
Total deaths	7,222	7,379
Average for 3 prior years	7,309	
Total deaths, first 36 weeks of year	299,145	302,822
Deaths per 1,000 population, first 36 weeks of year, annual rate	11 7	11 8
Deaths under 1 year of age	537	529
Average for 3 prior years	488	
Deaths under 1 year of age, first 36 weeks of year	20,232	18,723
Data from industrial insurance companies:		
Policies in force	65,013,474	64,458,633
Number of death claims	8,019	10,202
Death claims per 1,000 policies in force, annual rate	6.4	8 3
Death claims per 1,000 policies, first 36 weeks of year, annual rate	9 3	9.6

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED SEPTEMBER 19, 1942

Summary

The incidence of poliomyelitis declined from 267 cases last week to 229 cases for the current week, with more than one-half of the cases occurring in the East North Central States (73 cases) and the Middle Atlantic States (62 cases). The largest numbers of cases were reported in Illinois (52), New York (27), New Jersey (20), Pennsylvania (15), and Nebraska (11). No other State reported more than 10 cases.

Although the incidence of meningococcus meningitis declined from 46 to 43, it remains above the 5-year (1937–41) median (31) and above any other year since 1937. Meningococcus meningitis and measles are the only common communicable diseases, for which comparable figures are available, that are above the 5-year medians to date this year.

Other reports for this week include 2 cases of anthrax (1 each in New York and Pennsylvania), 31 cases of amebic dysentery, 259 cases of bacillary dysentery (112 in Texas), 170 cases of unspecified dysentery (139 in Virginia), 25 cases of infectious encephalitis, 15 cases of Rocky Mountain spotted fever, 9 cases of smallpox, 9 cases of tularemia, 133 cases of endemic typhus fever (51 in Georgia and 33 in Texas), and 7 cases of undulant fever (5 in Pennsylvania and 1 each in Rhode Island and North Carolina).

The death rate for the current week in 88 large cities of the United States is 10.9 per 1,000 population, as compared with 10.1 for the preceding week, and with a 3-year (1939–41) average of 10.5.

Telegraphic morbidity reports from State health officers for the week ended September 19, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Meas'es			Meningitis, meningococcus		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Sept. 19, 1942	Sept. 20, 1941		Sept. 19, 1942	Sept. 20, 1941		Sept. 19, 1942	Sept. 20, 1941		Sept. 19, 1942	Sept. 20, 1941	
NEW ENG.												
Maine	0	0	1	------	------	------	3	13	7	5	0	0
New Hampshire	0	1	0	------	------	------	0	0	0	0	0	0
Vermont	0	0	1	------	------	------	30	2	1	0	0	0
Massachusetts	2	4	2	------	------	------	28	20	21	1	3	2
Rhode Island	1	4	0	------	------	------	3	0	2	0	0	0
Connecticut	0	1	1	------	------	1	5	12	8	0	0	0
MID. ATL.												
New York	3	7	10	[1] 3	[1] 2	[1] 4	32	56	56	8	2	4
New Jersey	5	3	3	5	3	3	21	26	26	2	2	0
Pennsylvania	5	1	17	------	------	------	26	75	75	3	4	3
E. NO. CEN.												
Ohio	3	6	12	18	4	7	12	14	14	3	0	0
Indiana	4	3	13	18	12	12	3	3	3	1	1	1
Illinois	13	16	17	4	2	5	20	21	21	0	1	1
Michigan [3]	3	0	2	15	------	1	11	22	22	1	0	1
Wisconsin	1	0	0	16	86	23	40	34	40	0	0	0
W. NO CEN.												
Minnesota	1	4	2	------	------	------	5	5	6	0	0	0
Iowa	30	0	2	------	2	------	4	3	4	0	0	0
Missouri	6	14	14	------	------	1	2	6	5	0	0	1
North Dakota	0	1	1	3	------	2	0	13	2	0	0	0
South Dakota	1	10	5	------	------	2	2	1	1	[illegible]	0	0
Nebraska	5	6	2	4	------	------	26	3	3	0	0	0
Kansas	4	1	5	1	------	1	5	6	6	0	1	0
SO. ATL.												
Delaware	0	0	0	------	1	------	1	2	1	0	0	0
Maryland [3]	1	2	4	------	1	1	5	13	5	2	2	1
Dist. of Col	1	0	1	------	------	------	1	6	0	1	0	0
Virginia	18	19	32	90	41	41	5	29	6	1	2	1
West Virginia	11	4	10	3	------	9	0	9	7	0	0	0
North Carolina	40	53	72	4	------	------	7	24	18	1	1	0
South Carolina	19	43	18	169	80	104	4	14	7	0	3	1
Georgia	21	35	35	27	11	4	1	21	3	0	0	0
Florida	5	5	8	1	2	------	6	3	3	0	1	1
E. SO. CEN.												
Kentucky	19	14	14	------	------	2	10	16	12	0	0	0
Tennessee	14	15	20	9	18	9	5	28	11	6	1	1
Alabama	18	20	30	10	8	8	4	7	5	0	0	1
Mississippi [3]	9	15	15	------	------	------	------	------	------	0	2	1
W. SO. CEN.												
Arkansas	17	4	16	7	9	9	4	11	10	0	0	0
Louisiana	0	7	8	------	26	2	0	3	1	0	2	1
Oklahoma	7	10	8	10	10	16	1	2	2	0	0	1
Texas	30	33	33	156	310	83	11	21	20	0	0	1
MOUNTAIN												
Montana	0	9	0	------	2	1	0	3	8	0	0	1
Idaho	0	0	0	------	------	------	1	1	4	0	0	0
Wyoming	0	3	1	9	3	------	3	1	1	1	0	0
Colorado	8	6	6	21	23	5	4	10	6	0	0	0
New Mexico	2	0	2	------	------	------	0	5	1	1	1	0
Arizona	1	0	0	55	32	23	3	12	3	0	0	0
Utah [3]	1	0	0	3	4	3	30	2	8	0	0	0
Nevada	0	0	------	------	------	------	0	0	------	0	0	------
PACIFIC												
Washington	7	0	0	------	------	------	43	11	10	1	1	0
Oregon	1	1	1	11	12	10	16	18	7	0	0	0
California	12	13	17	28	24	11	49	51	38	5	1	1
Total	349	393	504	700	728	420	492	658	591	43	31	31
37 weeks	8,541	8,836	13,646	83,065	492,650	161,915	468,877	826,898	350,169	2,584	1,544	1,544

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 19, 1942, and comparison with corresponding week of 1941 and 5-year median—Continued

Division and State	Poliomyelitis: Week ended Sept. 19, 1942	Poliomyelitis: Week ended Sept. 20, 1941	Poliomyelitis: Median 1937–41	Scarlet fever: Week ended Sept. 19, 1942	Scarlet fever: Week ended Sept. 20, 1941	Scarlet fever: Median 1937–41	Smallpox: Week ended Sept. 19, 1942	Smallpox: Week ended Sept. 20, 1941	Smallpox: Median 1937–41	Typhoid and paratyphoid fever: Week ended Sept. 19, 1942	Typhoid and paratyphoid fever: Week ended Sept. 20, 1941	Typhoid and paratyphoid fever: Median 1937–41
NEW ENG.												
Maine	0	0	0	6	6	5	0	0	0	0	0	0
New Hampshire	0	3	0	1	0	0	0	0	0	0	0	1
Vermont	2	1	1	3	3	3	0	0	0	4	0	0
Massachusetts	6	20	4	73	51	35	0	0	0	6	1	3
Rhode Island	0	3	1	2	3	1	0	0	0	1	1	1
Connecticut	6	10	1	15	19	12	0	0	0	1	1	4
MID. ATL.												
New York	27	113	91	78	65	70	0	0	0	7	18	22
New Jersey	20	27	21	22	19	16	0	0	0	3	6	6
Pennsylvania	15	70	40	66	42	73	0	0	0	20	17	20
E. NO. CEN.												
Ohio	9	34	34	87	64	79	0	0	0	7	6	19
Indiana	4	15	10	21	22	34	1	0	2	1	4	8
Illinois	52	25	25	49	73	94	0	0	0	10	9	16
Michigan [2]	8	20	20	27	76	81	0	0	0	1	10	10
Wisconsin	0	1	2	43	48	39	2	0	0	2	1	1
W. NO. CEN.												
Minnesota	5	24	24	14	25	25	0	1	1	1	2	2
Iowa	4	2	12	16	17	20	0	1	1	1	6	2
Missouri	3	5	5	18	18	27	0	1	1	4	9	14
North Dakota	0	0	0	4	4	5	0	0	0	0	1	1
South Dakota	1	0	2	10	9	9	0	0	0	0	0	0
Nebraska	11	1	5	7	3	11	0	0	0	0	1	0
Kansas	10	5	5	22	48	35	0	0	0	1	7	10
SO. ATL.												
Delaware	3	1	0	4	7	4	0	0	0	0	0	2
Maryland [3]	0	24	1	18	11	13	0	0	0	2	11	11
Dist. of Col.	0	2	2	8	5	5	0	0	0	1	0	4
Virginia	0	4	4	28	20	20	0	0	0	6	7	13
West Virginia	0	2	2	28	24	26	1	0	0	6	9	15
North Carolina	1	8	4	36	42	46	0	0	0	5	10	10
South Carolina	3	11	1	18	1	8	0	0	0	13	6	14
Georgia	0	22	2	23	23	20	0	1	0	2	16	13
Florida	1	6	1	5	2	3	0	0	0	1	1	4
E. SO. CEN.												
Kentucky	5	7	7	29	19	31	0	0	0	14	15	25
Tennessee	3	24	1	27	44	28	3	0	0	14	15	15
Alabama	0	57	3	32	13	19	0	0	0	5	8	9
Mississippi [3]	3	5	4	2	3	6	0	0	0	5	12	9
W. SO. CEN.												
Arkansas	8	2	1	4	2	6	1	2	0	8	16	14
Louisiana	0	2	2	2	2	4	1	0	0	6	25	18
Oklahoma	0	3	3	6	5	9	0	0	0	5	3	11
Texas	2	5	5	16	14	24	0	0	0	28	22	49
MOUNTAIN												
Montana	0	0	0	9	8	15	0	0	0	0	1	1
Idaho	0	0	0	3	1	3	0	0	0	0	3	4
Wyoming	0	0	0	1	3	3	0	0	0	0	0	0
Colorado	4	4	4	9	20	11	0	0	1	4	4	6
New Mexico	2	0	1	0	4	6	0	0	0	5	1	5
Arizona	0	2	2	1	3	2	0	0	0	5	1	3
Utah [2]	0	2	2	4	2	7	0	0	0	0	1	0
Nevada	0	0	------	------	0	------	0	0	------	1	0	------
PACIFIC												
Washington	1	5	5	12	8	15	0	0	0	1	3	3
Oregon	0	12	2	8	6	10	0	0	0	2	0	2
California	10	10	10	32	42	66	0	0	1	10	14	14
Total	229	599	599	949	949	1,182	9	6	42	219	304	468
37 weeks	2,398	5,798	5,609	92,221	92,815	119,962	634	1,173	8,184	4,919	6,106	9,211

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 19, 1942—Continued

Division and State	Whooping cough		Week ended Sept. 19, 1942								
	Week ended		Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	Sept. 19, 1942	Sept. 20, 1941		Amebic	Bacillary	Unspecified					
NEW ENG.											
Maine	35	10	0	0	0	0	0	0	0	0	0
New Hampshire	0	3	0	0	0	0	0	0	0	0	0
Vermont	48	3	0	0	0	0	0	0	0	0	0
Massachusetts	215	123	0	0	0	0	1	0	0	0	0
Rhode Island	23	42	0	0	0	0	0	0	0	0	0
Connecticut	61	84	0	0	1	0	0	0	0	0	0
MID. ATL.											
New York	337	370	1	2	45	0	2	0	1	0	0
New Jersey	183	153	0	0	1	0	0	0	0	0	0
Pennsylvania	241	214	1	1	2	0	0	0	0	0	0
E. NO. CEN.											
Ohio	139	279	0	0	2	0	1	0	2	0	0
Indiana	48	10	0	0	1	0	1	0	0	0	0
Illinois	298	197	0	0	17	0	3	0	4	0	0
Michigan [2]	256	263	0	1	3	0	1	0	0	0	0
Wisconsin	204	222	0	0	0	0	0	0	0	1	0
W. NO. CEN.											
Minnesota	55	90	0	2	0	0	1	0	0	0	0
Iowa	6	21	0	0	0	0	1	0	0	0	0
Missouri	1	12	0	0	0	0	1	0	2	0	0
North Dakota	4	10	0	0	0	0	1	0	0	0	0
South Dakota	0	50	0	0	0	0	1	0	0	0	0
Nebraska	9	21	0	0	0	0	0	0	0	0	0
Kansas	39	58	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	2	0	0	0	0	0	0	0	0	0	0
Maryland [2]	46	69	0	0	0	3	0	0	0	0	0
Dist. of Col	23	13	0	0	0	0	0	0	0	0	0
Virginia	47	27	0	0	0	139	0	0	1	0	1
West Virginia	17	24	0	0	0	0	0	0	0	0	0
North Carolina	52	97	0	0	3	0	0	0	1	0	2
South Carolina	26	60	0	0	12	0	0	0	0	0	5
Georgia	9	35	0	4	4	0	0	0	1	1	51
Florida	5	13	0	1	0	0	0	0	0	0	8
E. SO. CEN.											
Kentucky	24	88	0	0	4	0	0	0	0	0	0
Tennessee	28	33	0	2	0	2	0	0	1	3	0
Alabama	42	13	0	0	0	0	0	0	0	0	15
Mississippi [2]	------	------	0	0	0	0	0	0	0	1	0
W. SO. CEN.											
Arkansas	28	10	0	5	30	0	0	0	0	1	2
Louisiana	2	1	0	0	0	0	0	0	0	0	15
Oklahoma	4	5	0	0	0	0	0	0	1	0	1
Texas	99	93	0	9	112	0	0	0	0	1	33
MOUNTAIN											
Montana	34	12	0	0	0	0	1	0	0	0	0
Idaho	4	0	0	0	0	0	0	0	0	0	0
Wyoming	41	27	0	0	0	0	0	0	0	1	0
Colorado	17	83	0	0	6	0	1	0	0	0	0
New Mexico	14	21	0	0	1	0	0	0	0	0	0
Arizona	7	13	0	0	0	26	0	0	0	0	0
Utah [2]	14	27	0	0	0	0	0	0	0	0	0
Nevada	3	3	0	0	0	0	0	0	1	0	0
PACIFIC											
Washington	16	51	0	1	0	0	4	0	0	0	0
Oregon	15	33	0	0	0	0	0	0	0	0	0
California	187	240	0	3	15	0	5	0	0	0	0
Total	3,008	3,276	2	31	259	170	25	0	15	9	133
37 weeks	133,994	159,204	------	------	------	------	------	------	------	------	------

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended September 5, 1942

This table lists the reports from 86 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Baltimore, Md	2	0	2	1	3	2	8	0	2	0	0	43
Barre, Vt	0	0		0	0	0	0	0	0	0	0	0
Billings, Mont	0	0		0	1	0	0	0	0	0	0	1
Birmingham, Ala	1	0		0	0	0	4	2	0	0	0	0
Boston, Mass	0	0		0	2	1	9	0	17	0	1	31
Bridgeport, Conn	0	0		0	0	0	1	0	2	0	1	0
Brunswick, Ga	0	0		0	0	0	0	0	0	0	0	0
Buffalo, N. Y	2	0		0	1	0	2	1	3	0	0	14
Camden, N. J	0	0		0	0	0	0	0	1	0	0	4
Charleston, S. C	1	1		1	1	0	0	1	1	0	0	0
Charleston, W. Va	0	0	1	0	0	0	0	0	0	0	0	0
Chicago, Ill	7	0		1	5	3	16	8	16	0	2	179
Cincinnati, Ohio	1	0		0	1	0	0	5	5	0	0	13
Cleveland, Ohio	0	0	6	0	3	0	3	6	10	0	0	35
Columbus, Ohio	0	0		0	0	0	1	0	9	0	1	8
Concord, N. H	0	0		0	0	0	0	0	0	0	0	0
Cumberland, Md	0	0		0	0	0	0	0	0	0	0	0
Dallas, Tex	1	0	1	1	0	0	2	0	0	0	0	11
Denver, Colo	2	1	5	0	2	0	2	0	0	0	0	12
Detroit, Mich	3	0	1	0	4	0	11	2	15	0	1	120
Duluth, Minn	0	0		0	0	0	0	0	0	0	0	5
Fall River, Mass	0	0		0	1	0	2	0	4	0	0	6
Fargo, N. Dak	0	0		0	1	0	1	1	0	0	0	0
Flint, Mich	1	0		0	0	0	1	0	2	0	0	2
Fort Wayne, Ind	0	0		0	0	0	2	0	0	0	0	1
Frederick, Md	0	0		0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0		0	0	0	1	0	0	0	0	1
Grand Rapids, Mich	0	0		0	0	0	0	1	0	0	0	5
Great Falls, Mont	0	0		0	1	0	2	0	0	0	0	1
Hartford, Conn	0	0		0	0	0	3	1	3	0	0	17
Helena, Mont	0	0		0	0	0	0	0	0	0	0	0
Houston, Tex	2	0		0	0	0	7	0	0	0	2	0
Indianapolis, Ind	0	0		0	3	0	5	3	3	0	0	10
Kansas City, Mo	1	0		0	0	0	3	0	3	0	0	2
Kenosha, Wis	0	0		0	0	0	0	0	0	0	0	14
Little Rock, Ark	0	0		0	0	0	2	0	0	0	0	0
Los Angeles, Calif	0	0	7	0	7	1	6	2	4	0	1	15
Lynchburg, Va	1	0	0	0	0	0	2	0	0	0	0	8
Memphis, Tenn	0	0		2	1	0	2	2	3	0	0	13
Milwaukee, Wis	0	0		0	5	0	0	1	7	0	0	32
Minneapolis, Minn	0	0		0	0	1	3	1	4	0	0	1
Missoula, Mont	0	0		0	0	0	1	0	0	0	0	0
Mobile, Ala	0	0		0	0	0	0	1	0	0	0	0
Nashville, Tenn	0	0		0	0	0	2	0	1	0	0	7
Newark, N. J	0	0		0	4	0	3	4	0	0	0	18
New Haven, Conn	0	0		0	0	0	1	0	1	0	0	7
New Orleans, La	0	0	2	2	0	0	6	0	2	0	4	0
New York, N. Y	6	1	4	0	15	7	37	7	20	0	4	149
Omaha, Nebr	0	0		0	0	0	3	0	1	0	0	3
Philadelphia, Pa	1	0		0	4	1	7	1	15	0	3	70
Pittsburgh, Pa	1	0		0	0	1	6	3	1	0	0	6
Portland, Maine	0	0		0	11	1	3	0	1	0	0	0
Providence, R. I	0	0		0	4	0	2	0	1	0	1	8
Pueblo, Colo	0	0		0	0	0	0	0	0	0	0	0
Racine, Wis	0	0		0	0	0	0	0	2	0	0	8
Raleigh, N. C	0	0		0	0	0	0	0	0	0	0	1
Reading, Pa	0	0		0	0	0	2	0	0	0	0	6
Richmond, Va	0	0		0	0	0	1	0	1	0	0	1

City reports for week ended September 5, 1942—Continued

	Diphtheria cases	Encephalitis, infectious cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va	0	0		0	0	0	0	0	0	0	0	1
Rochester, N. Y	0	1		0	0	0	1	2	1	0	1	13
Sacramento, Calif	0	0		0	1	0	1	0	1	0	0	6
Saint Joseph, Mo	0	0		0	0	0	0	0	1	0	0	0
Saint Louis, Mo	1	1		0	1	0	9	3	9	0	3	8
Saint Paul, Minn	0	0		0	2	0	3	1	4	0	0	47
Salt Lake City, Utah	0	0		0	6	0	1	2	0	0	0	2
San Antonio, Tex	1	0		1	0	0	0	1	0	0	0	3
San Francisco, Calif	0	0	1	1	12	1	3	0	2	0	0	15
Savannah, Ga	0	0		0	0	0	0	0	1	0	1	3
Seattle, Wash	1	0		0	4	0	2	0	1	0	0	20
Shreveport, La	0	0		0	0	0	5	0	0	0	2	0
Spokane, Wash	0	0		0	4	0	0	0	1	0	0	7
Springfield, Ill	0	0		0	0	0	1	0	1	0	0	10
Springfield, Mass	0	0		0	0	0	1	0	10	0	0	8
Superior, Wis	0	0		0	0	0	0	0	0	0	2	2
Syracuse, N. Y	0	0		0	3	0	4	0	0	0	1	15
Tacoma, Wash	0	0		0	10	0	1	0	1	0	0	2
Tampa, Fla	0	0		0	0	0	1	0	0	0	0	0
Terre Haute, Ind	1	0		0	0	0	0	0	0	0	0	0
Topeka, Kans	0	0		0	0	0	0	0	0	0	0	1
Trenton, N. J	0	0	1	0	0	0	1	0	3	0	0	7
Washington, D. C	2	0		0	1	0	7	0	5	0	0	10
Wheeling, W. Va	0	0		0	0	0	1	0	1	0	0	6
Wichita, Kans	0	0		0	0	0	4	0	0	0	0	7
Wilmington, Del	0	0		0	0	0	4	0	2	0	1	2
Winston-Salem, N. C	1	0		0	0	0	1	0	0	0	0	2
Worcester, Mass	0	0		0	0	0	4	0	1	0	0	34

Anthrax—Cases: New Orleans, 1.

Dysentery, amebic—Cases: Birmingham, 3; Boston, 2; Detroit, 1; San Francisco, 1.

Dysentery, bacillary—Cases: Baltimore, 5; Chicago, 4; Columbus, 1; Detroit, 1; Los Angeles, 8; Nashville, 5; New Haven, 1; Richmond, 1; St. Louis, 8; San Francisco, 3.

Rocky Mountain spotted fever—Cases: Columbus, 1.

Typhus fever—Cases: Brunswick, 1; Houston, 1; Mobile, 3; Nashville, 1; New York, 2, Savannah, 2; Raleigh, 2.

Rates (annual basis) per 100,000 population for the group of 86 cities in the preceding table (estimated population, 1942, 33,662,622)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Week ended Sept. 5, 1942	6.20	4.96	1.55	19.21	35.63	31.75	0.00	4.96	173.33
Average for week 1937-41	9.23	4.54	1.41	1 29.74	36.00	32.56	0.31	9.70	184.22

1 Median.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—During the week ended August 22, 1942, 6 rats proved positive for plague were reported in Hamakua, Paauhau area, island of Hawaii. During the same week one rat proved positive for plague was reported in the Makawao area, about 9.4 miles from the port of Kahului, on the Island of Maui, Hawaii Territory.

Panama Canal Zone

Notifiable diseases—June 1942.—During the month of June 1942, certain notifiable diseases were reported in the Panama Canal Zone and terminal cities and vicinities, as follows:

Disease	Panama		Colon		Canal Zone		Outside the Zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	7				3		1		11	
Diphtheria	11		6		4				21	
Dysentery (amebic)					5		3	1	8	1
Dysentery (bacillary)	1	1			1		6	6	8	7
Leprosy	1								1	
Malaria [1]	36	3	12	1	1,029	2	318	5	1,395	11
Measles	5		4		55		3		67	
Meningitis, meningococcus	1				2				3	
Mumps	1				3				4	
Paratyphoid fever					3		1		4	
Pneumonia					76				[2] 76	
Trachoma					1				1	
Tuberculosis		21		6	11	3		7	[2] 11	37
Typhoid fever	1								1	
Whooping cough					7				[2] 7	

[1] Includes 97 recurrent cases.
[2] Reported in the Canal Zone only.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended August 22, 1942.—During the week ended August 22, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis					2	1		1	5	9
Chickenpox				40	25	7	10	2	26	110
Diphtheria		11	1	14	2	4	2	1	1	36
Dysentery		2		17						19
German measles		8		1	7		2		3	16
Influenza					6				5	11
Lethargic encephalitis						3				3
Measles	1			71	18	3	20	5	3	116
Mumps		4		10	110	2	13	2	53	194
Pneumonia					2				1	3
Poliomyelitis		11	14	17	5				2	49
Scarlet fever		1	7	36	43	7	15	19	19	147
Tuberculosis	7		34	166	47		24	26	21	325
Typhoid and paratyphoid fever			4	18	6	2		3		33
Undulant fever				1	3					4
Whooping cough				254	68	2	10	2	32	368
Other communicable diseases		2		2	250	47	1	[illegible]	5	308

CUBA

Habana—Communicable diseases—4 weeks ended August 22, 1942.—During the 4 weeks ended August 22, 1942, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	19	2	Tuberculosis	4	1
Malaria	10		Typhoid fever	39	3
Measles	7		Whooping cough	1	1
Poliomyelitis	15		Yaws	1	1

Provinces—Notifiable diseases—4 weeks ended August 15, 1942.—During the 4 weeks ended August 15, 1942, cases of certain notifiable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	2	2	5	5		14	28
Diphtheria	1	23	4	4	1	2	35
Hookworm disease		23				2	25
Malaria	187	21		24	18	412	662
Measles	4	6		3		6	19
Poliomyelitis	3	26	1	2	8	37	77
Scarlet fever						1	1
Tuberculosis	8	11	7	26	17	42	111
Typhoid fever	13	57	19	51	29	56	225

[1] Includes the city of Habana.

FINLAND

Communicable diseases—May 1942.—During the month of May 1942, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	157	Poliomyelitis	3
Dysentery	5	Scarlet fever	634
Influenza	909	Typhoid fever	153
Paratyphoid fever	91		

PERU

Arequipa Province—Foot and mouth disease.—An outbreak of foot and mouth disease was reported in the Province of Arequipa on July 20, 1942, and on July 31 the Province was quarantined. On August 25 approximately 2,340 cases were reported present. To that date, only 1 human case had been reported. It is believed that the infection came from Nazca, where the disease had appeared 5 months previously, as Arequipa cattle are customarily sent there for pasturage during the fall and winter.

TANGANYIKA TERRITORY

Notifiable diseases—Year 1941.—During the year 1941, certain notifiable diseases were reported in Tanganyika Territory as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	13	2	Relapsing fever	2,219	15
Blackwater fever	72	8	Schistosomiasis	10,954	10
Cancer and other tumors	676	51	Senility		22
Cerebrospinal meningitis	3,749	541	Smallpox	92	6
Dysentery	2,992	35	Syphilis	36,487	19
Gonorrhea	15,829	3	Trypanosomiasis	584	204
Hookworm disease	16,386	139	Tuberculosis	3,618	96
Malaria	79,520	81	Typhoid fever	142	26
Paratyphoid fever	18		Yaws	77,909	6
Plague	2	2			

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given

CHOLERA

[C indicates cases]

NOTE—Since man; are for approximate

Place		January–June 1942	July 1942	August 1942—week ended— 1	8	15	22	29
ASIA								
Ceylon	C	82			12			
China Kunming (Yunnanfu)	C	912						
India	C	32,689						
Calcutta	C	1,151	594	78				
Chittagong	C	55						
Rangoon	C	1						
India (French)	C	10						

PLAGUE

[C indicates cases P present]

Place		January–June 1942	July 1942	August 1942—week ended— 1	8	15	22	29
AFRICA								
Basutoland	C	10						
Belgian Congo	C	2						
British East Africa								
Kenya	C	535						
Nairobi	C	64						
Uganda	C	276						
Egypt Port Said	C	1			1			
Madagascar	C	84			2	[illegible]	2	
Morocco	C	277		2	9	1	14	
Senegal	C							[1] 4
Union of South Africa	C	68						
ASIA								
China [2]								
India	C	385						
Indochina (French)	C	70					1	
Palestine Haifa	C	4			1			
EUROPE								
Portugal Azores Islands	C	1	- -					
NORTH AMERICA								
Canada Alberta Province—Plague infected fleas		- -	P					
SOUTH AMERICA								
Argentina Cordoba Province	C	7						
Brazil								
Alagoas State	C	3						
Pernambuco State	C	6						
Chile Valparaiso	C	1						
Peru								
Ancash Department	C	6						
Lambayeque Department	C	3						
Libertad Department	C	6						
Salaverry—Plague infected rats		P						
Lima Department	C	49						
Lima	C	15						
Piura Department	C	15						
OCEANIA								
Hawaii Territory Plague-infected rats		24	3		2		7	
New Caledonia [3]								

[1] Includes 3 suspected cases

[2] Plague has been reported in China as follows Chekiang Province, Apr 1–10, 1942, 4 cases Fukien Province, Jan 1–Apr 5, 1942, plague appeared in 11 localities Hunan Province, week ended Apr 18, 1942, 2 cases Suiyuan Province, pneumonic plague appeared in epidemic form during the period Jan 1–Apr 4, in the northwestern area

[3] According to information dated Sept 7, 1942, one case of pneumonic plague was reported in Plumat about 12 miles from Noumea, New Caledonia

SMALLPOX

[C indicates cases]

Place		January–June 1942	July 1942	August 1942—week ended— 1	8	15	22	29
AFRICA								
Algeria	C	540	57					
Belgian Congo	C	249	72					
British East Africa: Tanganyika	C	15						
Dahomey	C	53	3					
French Guinea	C	76						
Gold Coast	C	1,075	20					
Ivory Coast	C	50						
Morocco	C	1,213	62	33	3	8	17	
Nigeria	C	1,302	54	56	49	56		
Niger Territory	C	512						
Portuguese East Africa	C	1	6					
Senegal	C	14	3					
Sudan (French)	C	158	8					
Tunisia	C	1						
Union of South Africa	C	567						
Zanzibar	C	[1] 2						
ASIA								
Ceylon	C	7						
China	C	9						
India	C	17,876	558					
Indochina (French)	C	2,556	194		58		42	
Iran	C	50						
Iraq	C	208	1					
Trans-Jordan	C	2						
EUROPE								
France:								
Seine Department	C	44						
Unoccupied zone	C	13						
Great Britain:								
England and Wales	C		3					
Scotland	C	5	37	6	1			
Portugal	C	36		1				
Spain	C	186	5	1				
Turkey	C				35	7	25	38
NORTH AMERICA								
Canada	C	2	2					
Mexico	C	37						
SOUTH AMERICA								
Brazil	C	1						
Colombia	C	296						
Venezuela (alastrim)	C	95	15					

[1] Imported.

TYPHUS FEVER

[C indicates cases; P, present]

Place		January–June 1942	July 1942	August 1942—week ended— 1	8	15	22	29
AFRICA								
Algeria	C	32,016	1,811					
Basutoland	C	32						
British East Africa: Kenya	C	8						
Egypt	C	21,427	745		120	104	52	
Ivory Coast	C	4						
Morocco	C	23,330	1,788	134	115	78	58	
Nigeria	C	5						
Niger Territory	C	1						
Senegal	C	[1] 3						
Sierra Leone	C	7						
Tunisia	C	14,589	838		156			
Union of South Africa	C	507						

[1] Suspected.

TYPHUS FEVER—Continued

[C indicates cases; P, present]

Place		January–June 1942	July 1942	August 1942—week ended— 1	8	15	22	29
ASIA								
China	C	145						
India	C	6						
Iran	C	589	52					
Iraq	C	78	5			4		
Palestine	C	22		4	1			
Syria	C	22						
Trans-Jordan	C	5						
EUROPE								
Bulgaria	C	592	17	2				
Czechoslovakia	C	5						
France:								
Seine Department	C	1						
Unoccupied zone	C	226		1	1			
Germany	C	1,817						
Hungary	C	664	49	2	2	8		
Irish Free State	C	9				5		
Portugal	C	1						
Rumania	C	3,301	43	18	11	6	13	10
Spain	C	3,850	15	3				
Canary Islands	C	1						
Switzerland	C				1			
Turkey	C	P	32	3	3	12	6	11
Union of Soviet Socialist Republics	C	67						
NORTH AMERICA								
Guatemala	C	107	7					
Jamaica	C	27	3					
Mexico	C	376	30					
Panama Canal Zone	C	1						
Puerto Rico	C	3						
SOUTH AMERICA								
Chile	C	42	7					
Colombia	C	1						
Ecuador	C	14	37		12	6		
Venezuela	C	16						
OCEANIA								
Australia	C	18	1					
Hawaii Territory	C	26	5	1		2		

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January–June 1942	July 1942	August 1942—week ended— 1	8	15	22	29
AFRICA								
Belgian Congo: Libenge	D	[1] 1						
British East Africa: Kenya	C	1						
French West Africa	C	1						
Gold Coast	C	[2] 2						
Ivory Coast [3]	C	[2] 2						
Nigeria	C			[1] 1				
Senegal [4]	D					1		
Sierra Leone: Freetown	C	2						
Sudan (French)	D	[1] 1						
Togo: Hohoe	C	1						
SOUTH AMERICA [5]								
Brazil: Acre Territory	D	4						
Colombia:								
Boyaca Department	D	2	3					
Cundinamarca Department	D		3			[6] 1		
Intendencia of Meta	D	1	2					
Santander Department	D	2				[6] 2		

[1] Suspected.
[2] Includes 1 suspected case.
[3] During the week ended September 5, 1942, 2 deaths from suspected yellow fever were reported in Bobo Dioulasso, Ivory Coast.
[4] According to information dated February 9, 1942, 15 deaths from yellow fever among Europeans have occurred in Senegal.
[5] All yellow fever in South America is of the jungle type unless otherwise specified.
[6] For the period July 19–August 11, 1942.

THE TOXICITY AND POTENTIAL DANGERS OF TOLUENE, WITH SPECIAL REFERENCE TO ITS MAXIMAL PERMISSIBLE CONCENTRATION [1]

A Review

This study of the potential dangers of toluene covers experiments regarding its acute and chronic toxicity for humans, dogs, and rats. Exposure of humans to concentrations of 50 to 800 p. p. m. of toluene in air showed that such exposure had no effect on the circulation and respiration and caused only a moderate temporary lymphocytosis immediately after the exposure. It was found, however, that concentrations of 200 p. p. m. and more caused disturbances of the reaction time, incoordination, fatigue, and other subjective symptoms. It appears that as far as the toxicity is concerned the maximal permissible concentration of toluene in air for 8 hours exposure daily is 200 p. p. m. and that in operations which offer specific accident hazards this concentration may prove to be too high.

The elimination of hippuric acid in the urine and the concentration of toluene in the blood increase with the concentration of toluene in air. Especially with higher concentrations of toluene in air the administration of glycine reduces the toluene level in the blood of dogs and favors the excretion of hippuric acid with the urine, ascorbic acid being less effective in this respect.

Experiments with rats show that daily exposure for 7 hours on 5 days per week for 5 weeks to concentrations of 200 to 5,000 p. p. m. of toluene in air has no injurious effect on the blood-forming organs, as indicated by the absence of anemia and of changes in the bone marrow and the spleen. Exposure to concentrations of 2,500 to 5,000 p. p. m. of toluene in air results in rats in a daily shift of the blood picture, characterized by a decrease of the lymphocytes and the total white cell count with a moderate increase of the segmented cells. Exposure to concentrations of 600 to 5,000 p. p. m. of toluene in air caused in rats an enlargement of the liver and a decrease of the spleen volume, the former being associated with a change of the density of the liver cells.

These experiments indicate that toluene is less toxic than benzene with regard to the blood and blood-forming organs and less harmful than carbon tetrachloride with regard to the liver.

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[1] The toxicity and potential dangers of toluene, with special reference to its maximal permissible concentration. By W. F. von Oettingen, P. A. Neal, D. D. Donahue, J. L. Svirbely, H. D. Baernstein, A. R. Monaco, P. J. Valaer, and J. L. Mitchell. Public Health Bulletin No. 279. Government Printing Office, 1942. For sale by the Superintendent of Documents, Washington, D. C. Price 10 cents.

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Public Health Reports

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THE INCIDENCE OF PNEUMONIA AS RECORDED IN THE NATIONAL HEALTH SURVEY*

By **Rollo H. Britten**, *Senior Statistician, United States Public Health Service*

The incidence of pneumonia as recorded in the National Health Survey is presented in this report in relation to population and socio-economic factors, together with limited information on medical care. The data cover a period (1934–36) during which the mortality from the disease was neither unusually high nor unusually low in comparison with the years immediately before and after. This fact is brought out in figure 1, which shows the mortality rate from pneumonia for the United States as a whole for the years 1921 to 1939.

The National Health Survey [1] was a house-to-house canvass of 703,092 urban families in 18 States and 36,801 families in certain rural areas to determine the frequency of serious disabling illness, medical care received for such illness, and the relation of these items to social and economic conditions. The survey was patterned on previous ones conducted by the United States Public Health Service and in general followed the established techniques developed in such surveys, information being obtained by trained enumerators from the housewife or other responsible member of the household. Information was requested as to illnesses disabling for a week or more at any time during the 12 months preceding the date of the visit. It is felt that in the case of a severe disease such as pneumonia limitation to cases disabling for a week or longer does not result in the loss of an appreciable number of cases of the disease. It should be pointed out that

*From the Division of Public Health Methods, National Institute of Health. Assistance in the preparation of the materials for this study was furnished by the personnel of the Work Projects Administration (Official Project Nos. 712159-653/9999 and 765-23-3-10). Acknowledgment is also made to Mrs. Annie Stein and various other members of the National Health Survey staff for statistical assistance.

[1] Perrott, George St. J., Tibbitts, Clark, and Britten, Rollo H.: The National Health Survey: Scope and method of the Nation-wide canvass of sickness in relation to its social and economic setting. Pub. Health Rep., 54: 1663–1687 (1939).

Britten, Rollo H., Collins, Selwyn D., and Fitzgerald, James S.: The National Health Survey: Some general findings as to disease, accidents, and impairments in urban areas. Pub. Health Rep., 55:444–470 (1940).

National Health Survey, 1935–1936: Pneumonia in urban United States: Frequency, severity, and medical care. Preliminary Reports, Sickness and Medical Care Series, Bulletin 11, Division of Public Health Methods, National Institute of Health, U. S. Public Health Service: 1938. [Processed] (Prepared by David E. Hailman of the Health Survey staff.)

the instructions provided that cases ending fatally were to be included even if the duration from the beginning of symptoms was less than a week. The population surveyed comprised 2,152,741 white [2] persons

FIGURE 1.—Annual mortality from pneumonia. United States, 1921–39. (From Special Reports, Vital Statistics Division, U. S. Census Bureau.)

of known age and known family income. This is the group for which the pneumonia record will be shown in this paper.

The urban surveyed population was so distributed as to give a sample which was generally representative of cities in the United States according to size and region. In large cities (100,000 population and over in 1930) the population to be canvassed was determined by a random selection of many small districts based on those used in the United States census of 1930.[3] In the smaller cities selected for study (between 2,500 and 100,000 population) the population was completely enumerated. The rural survey was made in three States in order that at least indicatory data might be obtained on the rural health problem.

Except where otherwise indicated, the cases of pneumonia considered in this report include, in addition to the primary cases, those in which the diagnosis was recorded as contributory to another diagnosis for the same illness or period of disability. Inclusion of the contributory cases makes the rate about 14 percent higher than if it were limited to primary cases.

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[2] Data for the colored population have been excluded because it was felt that the record obtained for pneumonia in this group was not sufficiently complete.

[3] The representativeness of the sample has been shown by comparisons with 1930 census population data. (See Perrott, Tibbitts, and Britten, op. cit.)

The frequency rates do not include cases for which no medical attendant was reported (about 2 percent of the total). Obviously, no information is possible from a survey of this type as to the number of unattended cases of pneumonia which occur in this country, since a medical diagnosis is necessary to determine the presence of the disease. The presumption is that such cases are more likely to occur in the low income groups.

The rates have been adjusted on the basis of a sample study of diagnosis reports received from physicians and hospitals. This adjustment increased the rates about 5 percent. Even with this correction, however, it is felt that the rates must be regarded as somewhat below the true incidence of pneumonia because of difficulties in the complete enumeration of disease.[4]

FINDINGS FOR THE TOTAL URBAN POPULATION

For the white urban population as a whole the annual frequency of pneumonia (sole, primary, and contributory cases) was 5.4 per 1,000 persons.[5] Although newer methods of treatment since the time of the survey may have lowered the mortality and disability from the disease, it is not felt that they would have affected the incidence.

The average duration of disability of the sole and primary cases was 39 days, with an annual disability rate of 185 days per 1,000 observed persons—or about two-tenths of a day per person in the entire urban population.[6] Disability was defined to mean inability to work, attend school, care for home, or perform other usual activities.

In this report separate consideration is not given to the frequency of recorded cases which ended fatally. Information as to mortality is generally available from other sources. Furthermore, it has been generally recognized that, in house-to-house canvasses of the type under consideration, an appreciable proportion of deaths which occur in the sample areas are not recorded. The reasons for this loss are not entirely clear, but include disappearance of single-person households, breaking up of other households, lack of coverage of orphanages, homes for the aged, and other institutions in which the death rates are particularly high, and the difficulty of establishing the concept of reporting on persons who were no longer members of the household at the time of the survey. It is interesting to observe that the average

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[4] See Lienau, C. C.: Selection, training, and performance of National Health Survey field staff. Am. J. Hyg., 34 (Sec. A): 110–132 (November 1941).

[5] A record was also obtained as to the number of cases of pneumonia existing on the day of the visit, the rate being 0.61 per 1,000 persons. Owing to the fact that the period of the survey covered only the winter months, November–March, and therefore was not representative of the whole year, it has been felt desirable in this article to confine attention to the incidence of cases occurring during the 12 months preceding the date of the visit.

[6] The percentage distribution of these cases by duration of disability (based on a 5-percent random sample of the punched cards) was as follows: 7–10 days, 8.4; 11–17 days, 14.1; 18–24 days, 17.2; 1 month (25–44 days), 34.4; 2 months, 15.3; 3 months, 4.0; 4 months, 3.3; 5–7 months, 2.8; 8–11 months, 0.4.

duration of disability for recorded fatal cases of pneumonia was 18.9 as against 42.3 for nonfatal cases.

The annual mortality from pneumonia (sole and primary diagnoses) in urban United States was 84 per 100,000 persons in 1935. The annual incidence of pneumonia (sole and primary diagnoses) was 4.8 as recorded in the Health Survey. Hence, an estimated case fatality of 17.5 percent is obtained.

VARIATION BY AGE AND SEX

The annual frequency of pneumonia cases varied markedly with age (table 1 and fig. 2). The curve starts at a high point for infants [7] and young children, descends abruptly, reaching a low point at age 20, and then rises to another high point in old age. The figures indicate that 1 in every 40 persons has pneumonia during his first year of life.

TABLE 1.—*Annual frequency of pneumonia per 1,000 white persons observed, according to sex and age*

Age (years)	Annual frequency per 1,000 persons observed			Ratio of male rate to female rate (female rate =100)	Number of cases			Number of persons
	Both sexes	Male	Female		Both sexes	Male	Female	Both sexes
All ages	5.40	5.96	4.88	122	11,632	6,205	5,427	2,152,741
Under 1 [1]	28.10	31.38	24.70	127	416	235	181	29,619
1–4	16.20	17.52	14.84	118	1,959	1,077	882	120,917
5–9	9.80	11.15	8.42	132	1,708	981	727	174,354
10–14	3.37	3.57	3.17	113	654	347	307	193,877
15–24	2.54	3.09	2.06	150	972	554	418	381,991
25–34	3.18	3.41	2.97	115	1,149	577	572	361,681
35–44	3.63	3.98	3.29	121	1,227	655	572	338,272
45–54	4.31	4.72	3.90	121	1,135	624	511	263,123
55–64	5.96	6.75	5.23	129	965	525	440	162,012
65–74	9.24	9.16	9.30	98	839	378	461	90,785
75–84	16.00	16.14	17.37	93	503	221	282	31,440
85 and over	22.48				105	31	74	4,670

[1] In calculating the rates for this age group, the population has been divided by 2. (See footnote 7.)

The average number of days of disability per 1,000 persons observed was high in childhood, reached a minimum in the age group 15–24, and then rose rapidly (table 2). The severity in terms of days of disability per case tended to increase somewhat with age.

In contradistinction to most causes of illness, the annual frequency of pneumonia was higher among males than among females, the annual rates being, respectively, 6.0 and 4.9 per 1,000 persons. This finding confirms previous studies for mortality.[8] Table 1 presents the Health Survey rates by age and sex and the ratio of the male rate to the female rate at each age.

[7] Since age was recorded as of last birthday, persons under 1 year of age would on the average be under observation for one-half of a year. In calculating the rates for this age group, therefore, the population has been divided by 2.

[8] See especially Doull, J. A., Harmon, G. E., and Fisher, B.: The sex ratio of pneumonia mortality and its possible relation to occupation. Am. J. Hyg., 20: 628–640 (November 1934).

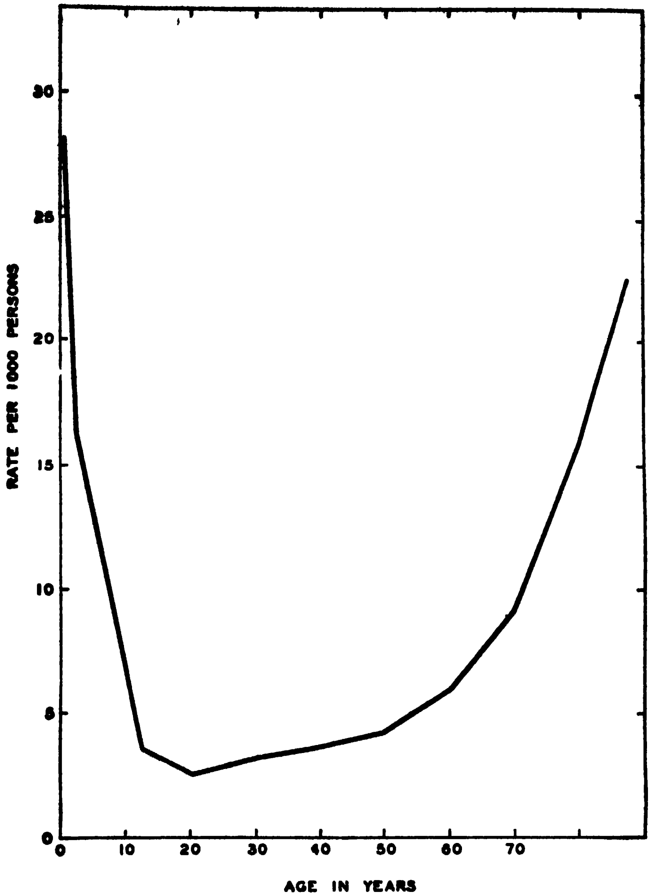

FIGURE 2.—Annual frequency of pneumonia by age.

TABLE 2.—*Annual days of disability per 1,000 white persons observed and per case of pneumonia,*[1] *according to age*

Age (years)	Annual number of days of disability per 1,000 persons observed	Days of disability per case	Number of persons
All ages	185	38.9	2,152,741
Under 15	294	35.6	518,767
15–24	90	38.8	381,991
25–64	146	41.7	1,125,088
65 and over	369	42.2	126,895

[1] Illnesses in which pneumonia was a contributory diagnosis have been excluded.

VARIATION BY GEOGRAPHIC REGION AND SIZE OF COMMUNITY

The cities enumerated in the National Health Survey have been classified into four geographic regions.[9] Table 3 shows that the incidence of pneumonia was not widely different in these regions. However, the highest rate was noted in the South and the lowest in the Northeast. The rates given in the table have been adjusted to the age composition of the enumerated white population in order to eliminate the effect of differences in the distribution of the population by age in the various regions and size of city groups.

TABLE 3.—*Annual frequency of pneumonia per 1,000 white persons observed, by geographic region and size of city, adjusted to a standard age composition*[1]

FREQUENCY PER 1,000 PERSONS OBSERVED

Size of city (population)	Geographic region				
	All regions	Northeast	North Central	South	West
Total	5.4	5.0	5.6	6.1	5.4
500,000 and over	5.1	5.2	5.0	----------	4.9
100,000 to 500,000	5.2	5.0	5.7	4.7	5.5
25,000 to 100,000	6.5	4.4	6.8	8.2	4.5
Under 25,000	5.6	4.2	6.0	6.7	6.1

NUMBER OF PERSONS OBSERVED

Size of city (population)	All regions	Northeast	North Central	South	West
Total	2,152,741	821,114	734,517	311,231	285,879
500,000 and over	934,542	514,555	356,438	----------	63,549
100,000 to 500,000	647,035	160,942	187,759	166,623	131,711
25,000 to 100,000	303,211	66,293	117,660	96,177	23,081
Under 25,000	267,953	79,324	72,660	48,431	67,538

[1] Adjusted to the age composition of all white persons enumerated in the National Health Survey.

It will also be noted from the table that there is no wide variation in the frequency of the rates by size of city. Certain differences appear, but they are not consistently maintained in each of the four regions.

In table 4 a limited amount of data is given for rural areas (towns and villages under 2,500 population and purely rural districts). It will be noticed that the rates (adjusted to a standard age composition) tend to be higher than those for urban areas. It is not felt that the rural data are representative of rural United States generally and therefore no combined figure is given, but the differences between urban and rural incidence of the disease are suggestive.

[9] The Health Survey States included in the four regions are: Northeast—Massachusetts, New Jersey, New York, Pennsylvania; North Central—Illinois, Michigan, Minnesota, Missouri, Ohio; South—Alabama, Georgia, Louisiana, Texas, Virginia; West—California, Oregon, Utah, Washington.

Northeast includes the New England and Middle Atlantic groups of the conventional census classification; North Central includes East and West North Central; South includes South Atlantic and East and West South Central; West includes Mountain and Pacific.

The names of the individual cities surveyed will be found in the report, Perrott, Tibbitts, and Britten, op. cit.

TABLE 4.—*Annual frequency of pneumonia per 1,000 white persons observed in specified rural counties* [1]

State and county	Rate per 1,000 persons observed		Number of persons observed	
	Towns and villages	Purely rural areas	Towns and villages	Purely rural areas
Michigan:				
Hillsdale County	10.0	7.3	3,903	16,069
Other [2]	6.1	5.7	4,653	7,248
Missouri:				
Howell County	12.3	9.8	2,128	14,295
Linn County	6.7	7.5	1,214	8,575
Livingstone County	----------	6.9	901	8,889
Georgia (16 counties)	9.3	8.2	6,866	24,788

[1] Adjusted to the age composition of all white persons enumerated in the National Health Survey.
[2] Crawford, Otsego, and Roscommon Counties.

RELATION TO ECONOMIC STATUS

Higher rates of pneumonia mortality in the lower socio-economic classes have been established in previous studies.[10] The National Health Survey shows that there is a similar relation for cases of pneumonia. In table 5 and figure 3 this comparison is made against annual family income. The figure uses broader age groups and

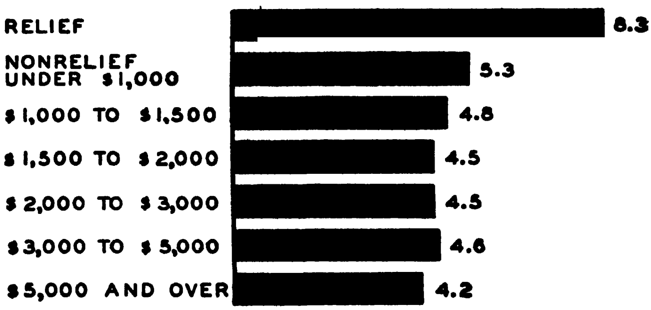

FIGURE 3.—Frequency rate of pneumonia for each income group (all ages, adjusted).

expresses the relation in terms of the ratio of the rate in each income group to that in the income group of $2,000 and over.

Income is defined to comprise all salaries, wages, business profits (including those received from boarding and lodging houses), income from boarders and lodgers in private families, and income from investments received during the survey year; it thus represents an approximate yearly income for the family. Families were not asked to report the exact amount of income, but were asked to locate themselves in one of the classifications shown in table 5. No allowances were made for income in kind. If a household had been in existence for less than

[10] See, for instance, Britten, Rollo H.: Mortality rates by occupational class in the United States. Pub. Health Rep., 49: 1101–1111 (1934).
Collins, Selwyn D.: Economic status and health. A review and study of relevant morbidity and mortality data. Pub. Health Bull. No. 165 (1926).

TABLE 5.—*Annual frequency of pneumonia per 1,000 white persons observed, according to age and economic status*

FREQUENCY PER 1,000 PERSONS OBSERVED

Annual family income and relief status	All ages: Crude	All ages: Adjusted[1]	Under 1[2]	1–4	5–9	10–14	15–24	25–34	35–44	45–54	55–64	65–74	75 and over
All known incomes	5.4	5.4	27.8	16.2	9.8	3.4	2.5	3.2	3.6	4.3	6.0	9.2	16.9
Relief	8.8	8.3	49.2	26.0	11.5	4.0	3.7	6.3	6.7	7.6	8.9	11.3	19.7
Nonrelief:													
Under $1,000	5.5	5.3	28.4	16.0	9.9	3.3	2.6	3.1	3.7	4.7	5.6	8.4	14.5
$1,000 to $1,500	4.8	4.8	21.0	13.5	9.1	2.7	2.2	3.0	3.1	3.9	5.0	10.0	17.0
$1,500 to $2,000	4.3	4.5	19.0	11.0	9.0	3.5	2.3	2.2	2.9	3.2	6.0	8.4	19.4
$2,000 to $3,000	4.2	4.5	12.2	10.0	9.3	2.9	2.3	2.6	3.1	3.5	5.6	9.1	15.6
$3,000 to $5,000	4.2	4.6	14.1	12.2	9.5	4.6	1.7	2.6	2.5	2.8	5.8	9.5	19.0
$5,000 and over	4.1	4.2		8.5	6.9	3.7	2.5	2.3	2.4	4.6	4.8	7.3	

NUMBER OF PERSONS OBSERVED

Annual family income and relief status	All ages	Under 1	1–4	5–9	10–14	15–24	25–34	35–44	45–54	55–64	65–74	75 and over
All known incomes	2,152,741	29,619	120,917	174,354	193,877	381,991	361,681	338,272	263,123	162,012	90,785	36,110
Relief	359,184	6,871	29,293	41,816	45,886	67,527	45,352	45,672	36,535	21,634	13,280	5,318
Nonrelief:												
Under $1,000	462,931	6,660	24,701	33,718	37,740	82,220	72,880	65,455	55,300	42,200	29,657	12,380
$1,000 to $1,500	511,211	7,580	30,431	42,298	44,673	89,006	96,413	82,131	58,833	34,540	18,358	6,948
$1,500 to $2,000	385,623	4,648	19,487	28,975	32,591	67,002	71,242	67,547	49,318	27,063	12,879	4,871
$2,000 to $3,000	275,302	2,709	11,763	18,562	21,706	48,186	49,612	49,835	38,138	21,240	9,656	3,825
$3,000 to $5,000	109,250	856	3,795	6,297	7,873	19,730	18,557	19,215	16,803	9,995	4,428	1,701
$5,000 and over	49,240	295	1,447	2,688	3,348	8,320	7,625	8,417	8,196	5,320	2,527	1,067

[1] Adjusted to the age composition of all white persons enumerated in the National Health Survey.
[2] In calculating the rates for this age group, the population has been divided by 2. (See footnote 7.)

1 year, the income was prorated on an annual basis. Families which reported the receipt of relief were not asked to specify the amount of income during the year. For the purpose of classifying persons by income, unrelated members of households (servants, roomers, etc.) are assigned to the income group corresponding to that of the family in which they live.

It will be observed that the annual frequency of pneumonia in relief families was 8.8 as against 4.1 for families with incomes of $5,000 and over. (The corresponding figures after adjustment had been made to a standard age composition were 8.3 and 4.2.) The nonrelief group with low incomes showed some excess over families with high incomes. It is to be presumed that the association between economic status and incidence of pneumonia would be even greater if it had been possible to obtain information as to cases of the disease which did not receive medical attention. The table and figure show that the differences by economic status are present at each age (except above 75 years). However, the most marked relation occurs among infants and very young children.

Because of the expensive nature of pneumonia treatment, it is important, in planning a public health program for the control of this disease, to know the relative number of cases which may be expected in each income group as well as the frequency rates. The percentage distribution of pneumonia cases according to economic status is therefore presented (table 6 and fig. 4).[11] Almost half of the cases (49 percent) occurred in families with incomes below $1,000 (relief and nonrelief). In evaluating these data account should be taken of the fact that the income distribution of the population was probably somewhat different at the time of the survey (1935–36) than it is at present.

TABLE 6.—*Percentage distribution and number of cases of pneumonia according to economic status*

Annual family income and relief status	Percentage distribution of cases	Number of cases	Number of persons observed
All incomes	100.0	11,632	2,152,741
Relief	27.2	3,161	359,184
Nonrelief:			
Under $1,000	21.9	2,553	462,931
$1,000 to $1,500	20.9	2,429	511,211
$1,500 to $2,000	14.3	1,664	385,623
$2,000 to $3,000	10.0	1,161	275,302
$3,000 to $5,000	4.0	461	109,250
$5,000 and over	1.7	203	49,240

[11] The percentage of cases in the relief population is thought to be definitely understated in view of studies showing that in the Health Survey an appreciable proportion of families which were on relief were not so recorded.

In tables 7 and 8 are given the severity and disability rates in relation to family income. For this comparison, only those illnesses with pneumonia as the sole or primary diagnosis are utilized. The severity of the pneumonia case evidently did not vary greatly with economic status; hence, the rates of disability reflect essentially the findings just discussed with reference to the incidence of the cases.

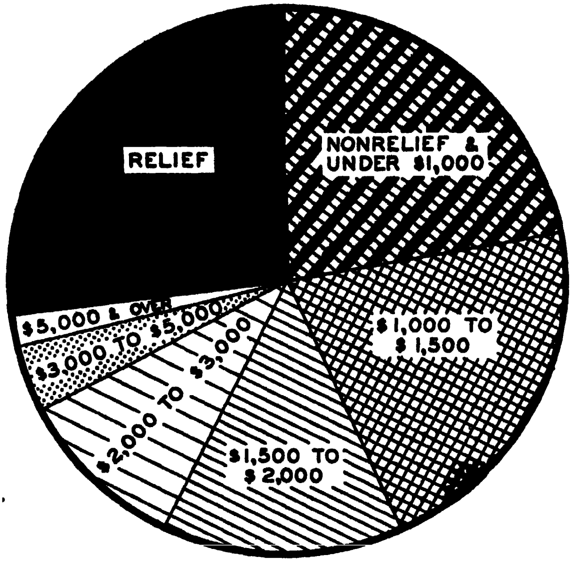

FIGURE 4.—Distribution of cases of pneumonia according to economic status.

TABLE 7.—*Days of disability per case of pneumonia*[1] *according to age and economic status*

Annual family income and relief status	Age (years)				
	All ages	Under 15	15–24	25–64	65 and over
All known incomes	38.9	35.6	38.8	41.7	42.2
Relief	40.6	36.0	37.4	47.0	47.7
Nonrelief:					
Under $1,000	39.5	34.4	42.9	42.5	43.1
$1,000 to $1,500	36.4	35.1	36.3	37.4	38.2
$1,500 to $2,000	37 4	36.1	36.7	38.1	39.9
$2,000 and over	40.1	36.9	40.6	41.7	42.3

[1] Illnesses with a contributory diagnosis of pneumonia are excluded.

Although, for the reasons stated previously, no particular consideration is given in this report to the record of fatal cases, it is felt that the absence of information from other sources as to the relative mortality rates by specific income groups justifies comparison on this basis. In figure 5, therefore, is shown the ratio of the death rate from pneumonia in each income group to that in the group with incomes of $2,000 and over. The ratios are based on rates adjusted to the age composition of the Health Survey white population.

TABLE 8.—*Annual days of disability from pneumonia* [1] *according to age and economic status*

Annual family income and relief status	Annual days of disability per 1,000 persons observed					
	All ages		Under 15 years	15–24 years	25–64 years	65 years and over
	Crude	Adjusted [2]				
All known incomes	185	185	294	90	146	369
Relief	314	304	418	124	291	486
Nonrelief:						
Under $1,000	190	187	286	102	154	327
$1,000 to $1,500	153	154	254	72	113	365
$1,500 to $2,000	142	148	239	76	106	359
$2,000 and over	149	156	235	81	122	134

[1] Illnesses with a contributory diagnosis of pneumonia are excluded.
[2] Adjusted to age composition of all white persons enumerated in the National Health Survey.

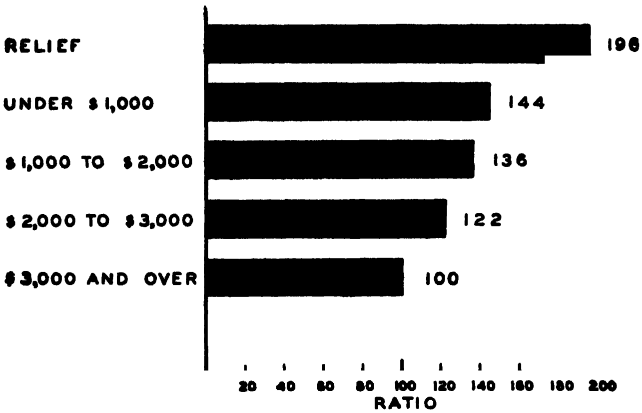

FIGURE 5.—Ratio of annual rate of fatal pneumonia cases (contributory cases are excluded) in each income group to that in the $2,000 and over income group. Adjusted to the age composition of all white persons enumerated in the National Health Survey.

PNEUMONIA AND HOUSING

National Health Survey data show that pneumonia occurred relatively more frequently in crowded households. Discussions of this point have already appeared,[12] but the importance of the relation merits its brief consideration in this report also. In table 9 and figure 6 the incidence of pneumonia is shown by degree of crowding. It will be observed that the adjusted [13] rate is 6.7 for families with more than 1½ persons per room as against 4.0 for families with 1 person or less per room. A similar difference is observed for the relief group and the nonrelief group under $1,000 when considered separately.

[12] Britten, Rollo H., Brown, J. E., and Altman, Isidore: Certain characteristics of urban housing and their relation to illness and accidents: Summary of findings of the National Health Survey. Milbank Memorial Fund Quarterly, 18: 91 (April 1940).

Britten, Rollo H., and Altman, Isidore. Illness and accidents among persons living under different housing conditions: Data based on the National Health Survey. Pub. Health Rep., 56: 609 (1941). Reprint 2253.

[13] See table for nature of this adjustment and also for description of the population used for this particular comparison.

TABLE 9.—*Annual frequency of pneumonia*[1] *according to persons per room,*[2] *economic status, and age*

Annual family income and relief status and age (years)	Degree of crowding: All households	1 person or less per room	More than 1 person per room but not more than 1.5	More than 1.5 persons per room	All households	1 person or less per room	More than 1 person per room but not more than 1.5	More than 1.5 persons per room
	Crude frequency rate per 1,000 persons				Adjusted[3] frequency rate per 1,000 persons			
All incomes:[4]								
All ages	4.5	4.0	5.5	6.9	4.5	4.0	5.4	6.7
Under 15	8.1	7.4	8.6	10.2	8.4	7.5	10.2	14.2
15–24	2.2	2.1	2.3	2.6	2.2	2.1	2.9	3.0
25–64	3.1	2.9	3.9	5.0	3.2	2.8	4.0	5.2
65 and over	7.3	7.2	8.8	6.7	7.7	7.6	8.9	-------
Relief:								
All ages	7.4	6.2	8.1	9.1	6.9	6.1	8.3	9.7
Under 15	11.6	10.6	11.8	12.6	12.7	11.2	13.6	19.8
15–24	3.0	3.1	2.0	2.9	3.5	3.2	4.3	3.3
25–64	5.4	4.6	6.1	7.0	5.4	4.5	6.7	7.9
Nonrelief, under $1,000:								
All ages	4.5	4.0	5.5	6.6	4.5	4.1	5.5	5.9
Under 15	8.4	7.9	8.5	10.0	8.8	8.0	10 4	11.8
15–24	2.2	2.0	2.5	3.0	2.2	2.0	2.9	-------
25–64	3.0	2.8	3.6	4.3	3.1	2.8	3.9	4.1
Nonrelief, $1,000 to $1,500:								
All ages	4.0	3.8	4.6	4.5	4.0	3.8	4.3	4.4
Under 15	7.1	7.2	7.0	6.8	7.4	7.1	7.6	7.3
15–24	1.9	1.9	2.1	1.1	1.9	1.8	1.9	1.6
25–64	2.8	2.7	3.2	3.5	2.8	2.6	2.9	3.8

[1] For reasons of tabulation, illnesses in which pneumonia was a contributory diagnosis are excluded.
[2] Data based on 1,769,993 white persons in [illegible] cities. The population is comprised of persons in households consisting of at least the household head and his wife.
[3] Rates for age groups adjusted to a standard household-size composition and, for all ages, to a standard age and household-size composition. Rates are not shown where there are fewer than 20 cases enumerated.
[4] Includes persons with income of $1,500 or more.

MEDICAL CARE

Because of the rapidly changing character of pneumonia treatment, the information on receipt of medical care for pneumonia cases in the National Health Survey, obtained in 1935–36, is not entirely indicatory of present conditions, but it does more or less show those existing prior to the introduction of the newer methods of treatment. In table 10 is presented a summary of the information, classified by size of the surveyed cities.[14] The cases under consideration are limited to those which were attended by doctors.[15] As stated previously, no information is available as to the number of cases of pneumonia which were not medically attended, since a medical diagnosis is necessary to determine the presence of the disease.

Because of the importance of bedside nursing in the treatment of pneumonia,[16] special emphasis is given to this aspect in the table. Thirteen percent of the cases received private-duty nursing care, 32 percent received floor nursing care in hospitals, and 40 percent re-

[14] For reasons of tabulation, illnesses in which pneumonia was the contributory diagnosis are not included in the tables in this section.
[15] The term "doctor" as used here refers to physicians and a relatively small group of other practitioners.
[16] Advisory Committee on Prevention of Pneumonia Mortality: Pneumonia—mortality and measures for prevention. Pub. Health Rep., Supplement No. 142, p. 18 (1938).

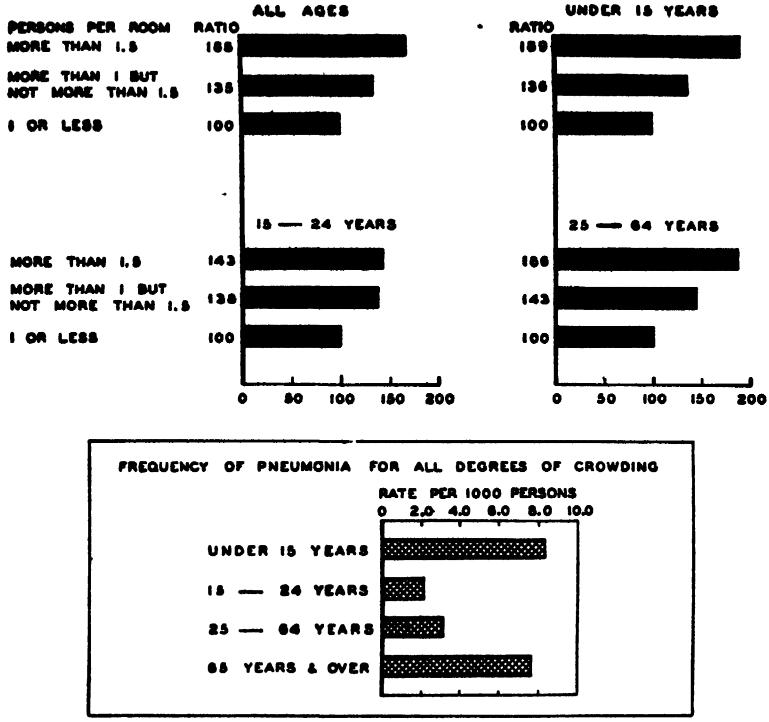

FIGURE 6.—Relative frequency of pneumonia according to persons per room (base, 100, for households with one or less person per room).

TABLE 10.—*Summary of medical and nursing care for pneumonia cases [1] according to size of city*

Type of information	Size of city (population)			
	All sizes	100,000 and over	25,000 to 100,000	Under 25,000
Private duty nursing care: [2]				
Cases per 1,000 persons	0.59	0.51	0.78	0.83
Percentage of cases receiving such care	12.7	11.7	18.2	17.0
Nursing days per 1,000 persons	9.9	9.1	10.8	13.8
Nursing days per private-duty nurse case	16.8	17.6	13.8	16.7
Hospital care: [3]				
Cases per 1,000 persons	1.5	1.5	1.5	.99
Percentage of cases hospitalized	31.7	35.3	26.1	20.3
Hospital days per 1,000 persons	28.2	31.0	22.2	18.5
Hospital days per hospital case	19.1	20.0	14.4	18.8
Percentage of cases receiving hospital and/or private-duty nursing care	40.5	43.5	34.7	32.9
Physician's home care: [4]				
Calls per 1,000 persons	40.0	37.1	49.5	46.7
Calls per case receiving such care	9.5	9.5	8.8	10.1
Visiting nurse care:				
Cases per 1,000 persons	.42	.42	.38	.44
Percentage of cases receiving such care	8.9	9.6	6.4	9.0
Nursing visits per 1,000 persons	3.6	3.8	2.6	3.8
Nursing visits per visiting nurse case	8.8	9.1	6.8	8.6

[1] Exclusive of illnesses in which pneumonia was a contributory diagnosis.
[2] Exclusive of floor-duty nursing service in hospital.
[3] Hospital care refers solely to in-patient care.
[4] Refers to cases treated at home by physician whether or not other types of medical services were also given.

ceived either hospital or private-duty nursing care or both. There was a marked variation with size of city.

In tables 11 and 12 and figure 7 the type of medical or nursing care is shown for the various income and size of city groups. It is clear that private-duty nursing care was limited largely to families in good economic circumstances. Perhaps the most striking point brought out is the fact that the proportion of cases receiving private-duty

TABLE 11.—*Percentage of pneumonia cases* [1] *which received private-duty nursing and hospital care according to size of city and economic status*

PERCENTAGE OF CASES RECEIVING PRIVATE-DUTY NURSING [2]

Annual family income and relief status	Size of city (population)			
	All sizes	100,000 and over	25,000 to 100,000	Under 25,000
All incomes	12.7	11.7	13.2	17.0
Relief	3.5	3.2	2.7	6.0
Nonrelief:				
Under $1,000	10.4	9.1	11.5	13.4
$1,000 to $2,000	13.3	11.4	17.2	19.5
$2,000 to $3,000	25.4	24.3	19.7	36.6
$3,000 and over	38.1	35.1	51.1	41.7

PERCENTAGE OF CASES RECEIVING HOSPITAL CARE [2]

Annual family income and relief status	All sizes	100,000 and over	25,000 to 100,000	Under 25,000
All incomes	31.7	35.3	26.1	20.3
Relief	39.6	46.7	28.6	17.5
Nonrelief:				
Under $1,000	28.8	33.9	23.4	18.3
$1,000 to $2,000	29.5	31.2	24.5	25.1
$2,000 to $3,000	26.8	28.9	27.4	19.0
$3,000 and over	28.3	26.6	35.2	

PERCENTAGE OF CASES RECEIVING PRIVATE-DUTY NURSING AND/OR HOSPITAL CARE

Annual family income and relief status	All sizes	100,000 and over	25,000 to 100,000	Under 25,000
All incomes	40.5	43.5	34.7	32.9
Relief	41.9	48.6	30.7	22.2
Nonrelief:				
Under $1,000	36.0	40.4	30.1	29.0
$1,000 to $2,000	38.4	39.1	36.0	37.1
$2,000 to $3,000	45.2	46.0	40.2	45.0
$3,000 and over	55.8	52.5	67.0	64.6

[1] Exclusive of illnesses in which pneumonia was a contributory diagnosis. [2] From table 10.

TABLE 12.—*Medical and nursing care per pneumonia case* [1] *according to size of city and economic status*

NURSING DAYS PER PRIVATE-DUTY NURSE CASE [2]

Annual family income and relief status	Size of city (population)			
	All sizes	100,000 and over	25,000 to 100,000	Under 25,000
All incomes	16.8	17.6	13.8	16.7
Relief	19.2	22.5	9.7	16.1
Nonrelief:				
Under $1,000	14.0	14.6	13.4	13.3
$1,000 to $2,000	16.1	16.4	13.7	18.1
$2,000 to $3,000	17.1	18.0	13.4	15.3
$3,000 and over	19.6	20.1	16.1	23.4

[1] Exclusive of illnesses in which pneumonia was a contributory diagnosis.
[2] From table 10.

TABLE 12.—*Medical and nursing care per pneumonia case according to size of city and economic status*—Continued

HOSPITAL DAYS PER HOSPITAL CASE[1]

All incomes	19 1	20 0	14 4	18 8
Relief	21 4	22 0	17.4	23.2
Nonrelief:				
Under $1,000	18 0	19.2	13.2	18.3
$1,000 to $2,000	17.7	18.7	13.2	16.1
$2,000 to $3,000	18 6	19.5	15.2	14.6
$3,000 and over	18 4	19 6	9.4	27 6

PHYSICIAN'S HOME CALLS PER HOME CASE

All incomes	9.5	9 5	8.8	10 1
Relief	6.9	6.7	6.6	7.9
Nonrelief:				
Under $1,000	9.7	9.8	9.8	9.4
$1,000 to $2,000	9.9	9 9	9.4	11 1
$2,000 to $3,000	11 6	11.9	8.3	12.8
$3,000 and over	12 7	12 7	12 9	12 4

[1] From table 11

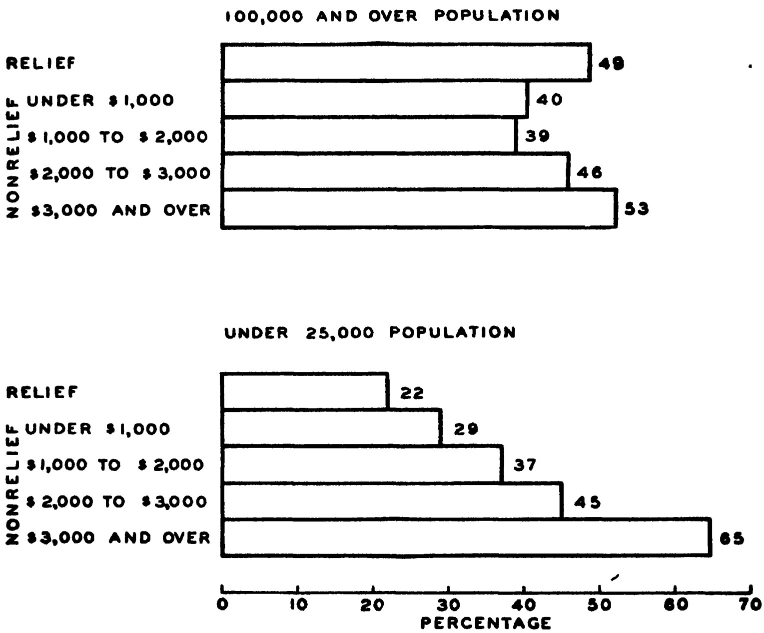

FIGURE 7.—Percentage of pneumonia cases which received private-duty nursing care or hospital care of both by city size and income.

nursing care or hospital care or both shows no very great difference by economic status in the large cities, whereas in the small cities the difference by economic status is very marked. For instance, in cities under 25,000 in population only 22 percent in the relief group received private-duty nursing care or hospital care or both, while in the group with family income of $3,000 and over the percentage was 65.

SUMMARY

In summary, it may be stated that:

1. The annual frequency of pneumonia (sole, primary, and contributory diagnoses) in urban areas was 5.4 per 1,000 white persons.
2. The average duration of the sole and primary cases was 39 days, with an annual disability rate of 185 per 1,000 persons.
3. Based on Health Survey incidence data and on mortality from pneumonia in urban United States in 1935, an estimated case fatality rate of 17.5 percent was obtained.
4. The rate was somewhat higher in the rural area sample.
5. The rate was higher among males than among females.
6. The frequency varied markedly with age, being highest in infancy and old age.
7. There was no great difference in frequency by geographic region or size of city.
8. The frequency was much greater in the low income families.
9. A close association between crowding and the incidence of pneumonia existed.
10. The proportion of cases receiving private duty nursing care or hospital care or both showed no very great difference by economic status in the large cities, whereas in the small cities the difference by economic status was very marked.

INFANT MORTALITY IN RURAL AND URBAN AREAS [1]

By Herbert J. Sommers, *United States Public Health Service*

Since 1915, the infant mortality rate in the expanding birth registration area of the United States has been reduced by more than half. Although the decline has not been continuous, the trend is well established. The rate in 1939, 48 deaths under one year per 1,000 live births, was 29 percent lower than the rate of 68 per 1,000 in 1929.

However, it has not been possible to determine how uniform the reduction in infant mortality has been throughout the total population. Prior to 1939 detailed tabulations of infant mortality records for rural and urban communities were made by place of occurrence of death rather than by place of residence of the infant. While such tabulations are satisfactory from the point of view of determining the need for expansion of hospital facilities in a given area, they may easily lead to erroneous conclusions as to the infant mortality rate for the population of a given area, for increasing proportions of births and infant deaths of rural residents have been occurring in urban hospitals. Depending upon the number of rural births and rural infant deaths occurring in urban areas, rural and urban infant mor-

[1] From the Division of Public Health Methods, National Institute of Health.

tality rates may have been higher or lower than they would have been if births and deaths had been allocated to place of residence.

An annual tabulation of births by place of residence has been made since 1935, but 1939 is the first year for which the Division of Vital Statistics of the Bureau of the Census has tabulated infant deaths in this manner.[2] It is now possible to calculate the effect of adjustment for residence upon rural and urban infant mortality rates. This paper will discuss the relative number of infant deaths in rural and urban areas[3] when the birth and mortality records have been adjusted for nonresidents.

The recorded rural and urban infant mortality rates in the expanding birth registration area are shown in figure 1. According to

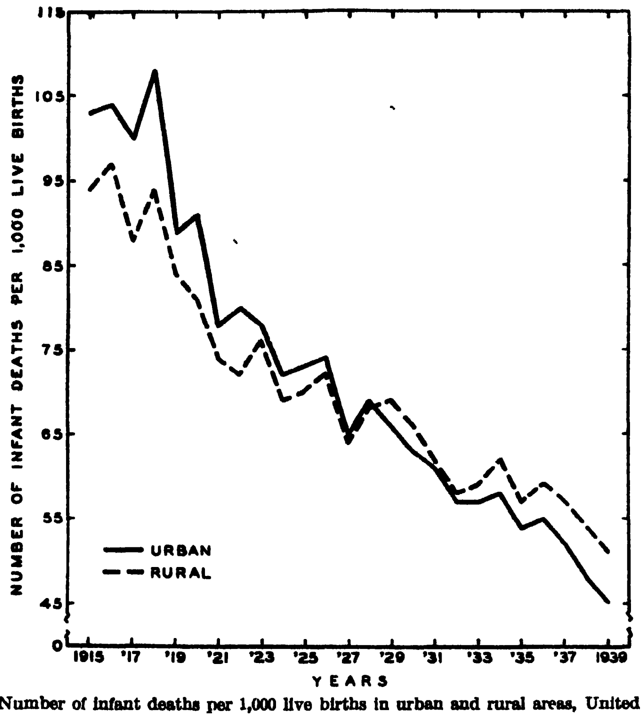

FIGURE 1.—Number of infant deaths per 1,000 live births in urban and rural areas, United States Birth Registration Area 1915–39. (Urban includes places of 10,000 or more population.)

these rates, based upon births and deaths tabulated by place of occurrence, the relative size of the infant mortality rate in rural and urban communities has been reversed during the 25-year period since 1915. From 1915 through 1928, the urban rate, although higher than the rural in every year, decreased more rapidly than the rural, so that in 1929, for the first time on record, the rate was lower in urban

[2] Vital Statistics—Special Reports. Vol. 12, No. 26, pp. 493–497. June 16, 1941.

[3] Urban areas are defined as all places with 10,000 or more population in 1930.

than in rural areas. Since then, without exception, the urban rate has been lower than the rural, and the difference between them has been increasing.

The question arises as to whether this apparently greater reduction of the infant mortality rate in urban than in rural territories is real—representing actually lower mortality per 1,000 live births among urban than among rural residents—or whether the urban rate was fictitiously lowered and the rural rate fictitiously raised by the occurrence of a larger proportion of rural births than of rural deaths in urban territories. The number of urban births and urban infant deaths occurring in rural areas is relatively small compared with the number of rural births and deaths occurring in urban areas.

Table 1 presents for each State white infant mortality rates in 1939, based upon birth and infant mortality records tabulated by place of residence, and the ratio of the recorded rate in each area to the corresponding resident rate. Rates for the white population are discussed independently of those for the nonwhite population in order

TABLE 1.—*Number of infant deaths per 1,000 live births, for whites in urban and rural areas, by place of residence; and the ratio of the recorded to the corresponding resident rate, each State, 1939 (urban includes places of 10,000 or more population)*

State	Resident rate		Ratio of recorded to resident rate	
	Urban	Rural	Urban	Rural
New England:				
Maine	60 9	49. 5	0. 86	1. 06
New Hampshire	50 3	44 1	. 85	1 13
Vermont	50. 3	44. 1	77	1. 10
Massachusetts	37. 2	35. 3	. 99	1. 04
Rhode Island	39. 0	37. 3	1. 01	98
Connecticut	36. 7	34 7	97	99
Middle Atlantic:				
New York	37. 0	40. 7	1. 00	1. 05
New Jersey	35. 3	37. 0	1 00	1. 12
Pennsylvania	43 6	45. 4	1. 03	. 96
East North Central:				
Ohio	39. 0	45. 0	1. 05	. 95
Indiana	44. 5	34. 6	. 95	1. 01
Illinois	34. 0	40. 6	1. 01	1. 02
Michigan	39. 0	44. 0	1. 09	. 88
Wisconsin	37. 9	41. 1	. 98	1. 02
West North Central:				
Minnesota	34. 8	35. 1	1. 03	. 99
Iowa	46. 6	35. 4	. 96	. 96
Missouri	35. 2	47. 1	1. 08	. 97
North Dakota	61. 1	45 7	. 83	1. 02
South Dakota	43. 3	35. 6	. 91	1. 03
Nebraska	40 7	35. 4	1. 01	. 94
Kansas	40. 5	37. 0	1. 01	. 99
South Atlantic:				
Delaware	40. 0	38. 2	. 89	1. 20
Maryland	34. 5	43. 6	1. 14	. 98
District of Columbia	38. 7	------	. 87	----
Virginia	41. 2	52. 5	1. 15	1. 01
West Virginia	48. 3	54. 3	1. 23	. 96
South Atlantic—Con.				
North Carolina	50 0	51. 4	1. 38	0. 90
South Carolina	49 5	55. 0	1. 33	. 91
Georgia	49. 4	50 5	1. 05	. 98
Florida	40 7	48. 9	1. 12	95
East South Central:				
Kentucky	55. 2	50. 0	. 91	1. 02
Tennessee	45 6	49 2	1. 27	. 95
Alabama	51. 9	48. 8	1. 04	. 99
Mississippi	86. 5	45. 1	. 79	1. 01
West South Central:				
Arkansas	48. 0	44 7	1. 10	. 96
Louisiana	42. 5	49. 4	1. 27	. 88
Oklahoma	49 6	45. 7	1. 02	. 97
Texas	69. 8	63. 8	. 99	. 99
Mountain:				
Montana	39. 8	44. 8	. 98	1. 04
Idaho	41 9	45. 9	. 88	1. 00
Wyoming	51 0	39. 7	. 99	1. 02
Colorado	46. 6	59. 7	1 02	1. 02
New Mexico	83 2	107. 2	1. 08	. 99
Arizona	82. 4	72. 7	. 93	1. 05
Utah	37. 0	39. 8	1. 00	1. 02
Nevada	32. 5	41. 8	. 76	1. 02
Pacific:				
Washington	35. 1	36. 0	. 96	1. 08
Oregon	27. 4	36 5	1. 19	. 97
California	36 2	50. 1	1. 05	. 99
Total, United States	41. 1	46. 9	1. 03	. 99

to minimize the effects of underregistration of births and deaths, which is greater for the nonwhite population.

Of the 1,024,753 white live births recorded in urban areas in 1939, 15 percent were born to nonresident rural women who had availed themselves of the superior hospital facilities of urban communities. But of the 43,282 white infant deaths recorded in urban areas, 18 percent were of nonresident rural infants. In contrast, 14 percent of the 1,112,943 white rural live births and 15 percent of the 52,148 rural infant deaths were recorded in urban areas. The white infant mortality rates in urban and rural areas of the United States in 1939, based on recorded births and deaths, were 42.2 and 46.5 per 1,000 live births respectively; the corresponding rates based on resident births and deaths were 41.1 and 46.9. Adjustment of the recorded births and deaths for residence decreased the urban rate by 3 percent, and increased the rural rate by 1 percent.

For the United States as a whole, it is safe to conclude that the trends in rural and urban infant mortality rates shown in figure 1 are substantially correct. Any error which has been introduced into the rates by the non-allocation of births and deaths to the place of residence would seem to be on the side of understatement of the difference between the urban and rural rates.

However, the effect of the correction for nonresidents is not uniform throughout the United States. Recorded rates ranged from 23 percent lower than the resident in the case of the urban rate for Vermont, to 38 percent higher than the resident in the urban rate for North Carolina. Urban recorded rates were lower than the corresponding resident rates by at least 10 percent in 9 States, and higher by at least 10 percent in 10 States. Rural recorded rates were lower by at least 10 percent in 3 States, and higher in 4.

In 1939 there were 23 States in which the urban resident rate was higher than the urban recorded rate. Among these we find 5 of the 6 New England States, 3 of the 6 West North Central States, and 6 of the 8 Mountain States. On the other hand, in 7 of the 9 South Atlantic States and 3 of the 4 West South Central States the urban rates were lowered by the correction for residence.

The recorded urban rate for any State is raised by adjustment for residence when a larger proportion of urban recorded births than of urban recorded infant deaths are of rural origin. Correcting the urban recorded rate for these nonresident births and deaths decreases the denominator of the [*infant deaths÷by live births*] fraction proportionately more than it does the numerator and so increases the rate. Such increased urban rates are most likely to be found in States or sections where a large proportion of the total births are delivered in hospitals. Since most hospitals are located in urban areas, a large proportion of hospital-delivered births to rural residents are delivered in urban areas.

A positive, though not very high, correlation does in fact exist between the proportion of all births in each State which took place in hospitals [4] and the corresponding ratio of the recorded to resident rural infant mortality rate. There are, of course, conspicuous exceptions; for example, Maine, Rhode Island, New Jersey, Oregon, and California.

It is probable that sectional or even specifically local differences in economic level and degree of health education account for most of the variation among the States in the use which rural populations make of urban medical facilities. It appears desirable, therefore, to re-evaluate rural and urban infant mortality rates in each State on the basis of data tabulated by residence.

The Division of Vital Statistics of the Bureau of the Census has released white infant mortality rates, calculated on the basis of resident births and deaths, in communities of three sizes, for the year 1939.[5] Rates were presented for cities, defined as all places with a population of 10,000 or more; towns, defined as all places with populations of 2,500 to 10,000; and rural territories, defined as all places with populations of less than 2,500.

For the United States as a whole, the lowest infant mortality rate was found in cities, reflecting superior medical, public health, and educational facilities. The city rate, 41.1 per 1,000 live births, was 11 percent lower than the rural rate of 46.1 per 1,000. Towns provided the least favorable opportunity for infant survival, having apparently sacrificed the healthful environment of the rural area without having attained the superior facilities of the city. The town rate of 50.1 per 1,000 live births was 9 percent higher than the rural rate.

The rate in towns was higher than the corresponding rural rate in all but 10 of the 48 States. These 10 were widely scattered geographically. The town rate was higher than the corresponding city rate in all but 9 States, 4 of which were in New England.

With only two exceptions, rural rates were higher than city rates throughout the Middle Atlantic, East North Central, and South Atlantic States. With five exceptions, city rates were higher than rural in the New England, West North Central, East South Central, West South Central, and Pacific States (fig. 2).

Infant mortality rates for urban areas, arranged in 4 groups of 12 States each, according to the descending order of the rates, are presented in figure 3, and for rural areas in figure 4. The rates used are the white, resident rates of table 1, where rural areas include all with populations of less than 10,000.

It is apparent that the rates were generally higher in the South than in other regions, although among the urban rates those of

[4] Vital Statistics—Special Reports Vol 12, No 2, pp 6-10 November 6, 1940

[5] Vital Statistics—Special Reports Vol 12, No 26, pp 493-497 June 16, 1941

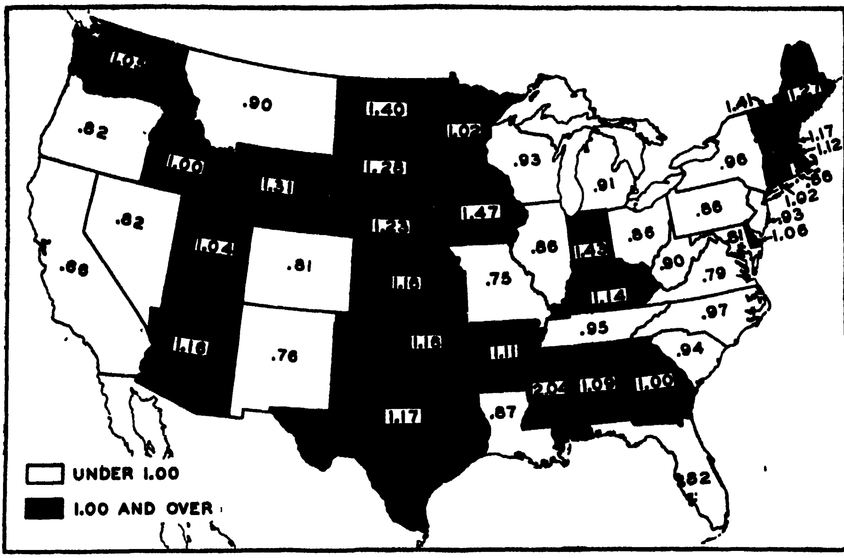

FIGURE 2.—Ratio of white infant mortality rate in cities of 10,000 or over to rate in rural areas of less than 2,500 population, births and deaths tabulated according to residence, United States, 1939.

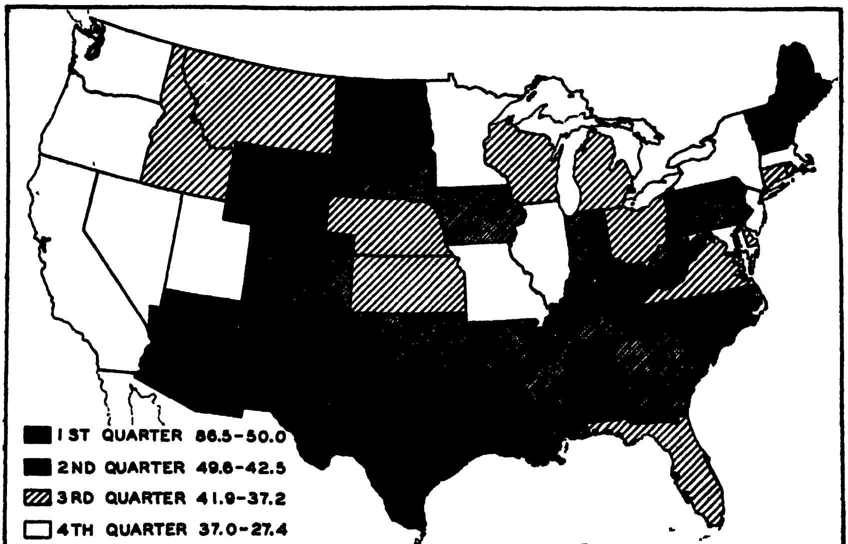

FIGURE 3.—Infant mortality rates for white urban residents, each State, arranged in 4 groups of 12 States each, according to descending order of the rates, 1939.

Maine, New Hampshire, Vermont, North Dakota, and Wyoming, and among the rural those of Maine and California were also very high. Rural rates were generally lowest in the Middle West. The size of the rural rate in California was probably due to the inclusion of Mexicans among the white population.

The preceding tables and discussion have been confined to white infant mortality rates partly because of the unknown but probably

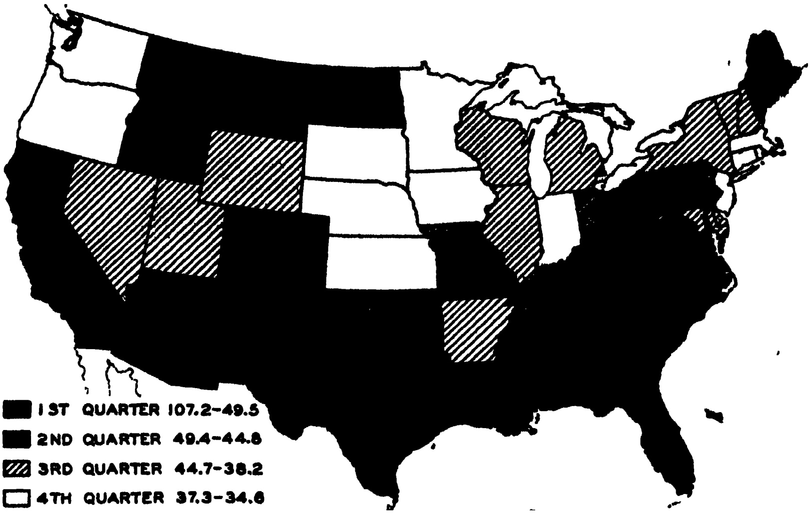

FIGURE 4.—Infant mortality rates for white rural residents, each State, arranged in 4 groups of 12 States each, according to descending order of the rates, 1939.

considerable degree of underregistration of nonwhite births and deaths, and partly because the nonwhite population, principally Negro, is not distributed equally among the States. Resident infant mortality rates for the nonwhite population in urban and rural areas of 17 southern and 9 northern States are presented in table 2.

The urban infant mortality rate among the southern nonwhite population has not been reduced relative to the rural, as it has been for the white population of the total United States and for the nonwhite population in the northern States. The southern urban rate of 85.0 infant deaths per 1,000 live births was 18 percent higher than the rural rate, whereas the corresponding rate of 60.7 per 1,000 for the northern States was 22 percent lower than the rural.

Urban rates for the nonwhite population in the northern States were much lower than those in the southern, 60.7 as compared with 85.0 deaths per 1,000 live births. However, rates in the rural South were lower than those in the rural North. This seeming anomaly arises from the fact that the nonwhite population in rural south areas is not strictly comparable to the non-white population in rural north areas. The former is composed in the main of rural farm

TABLE 2.—*Number of infant deaths per 1,000 live births, for nonwhite populations in urban and rural areas, by place of residence, 17 southern and 9 northern States, 1939 (urban includes places of 10,000 or more population)*

State	Resident rate		State	Resident rate	
	Urban	Rural		Urban	Rural
Alabama	99.0	70.4	West Virginia	55.9	73.9
Arkansas	67.6	48.7			
Delaware	44.9	79.1	South	85.0	72.1
District of Columbia	77.2				
Florida	84.6	78.1	Connecticut	55.8	75.0
Georgia	86.8	65.8	Illinois	57.3	123.6
Kentucky	69.4	94.7	Indiana	60.4	25.9
Louisiana	90.8	82.5	Massachusetts	41.1	61.8
Maryland	65.4	108.2	Michigan	53.4	93.9
Mississippi	94.0	59.5	New Jersey	64.9	74.4
North Carolina	90.9	72.4	New York	61.1	79.4
Oklahoma	84.4	82.7	Ohio	63.8	71.4
South Carolina	90.9	77.2	Pennsylvania	64.7	68.2
Tennessee	84.6	70.1			
Texas	86.4	77.3	North	60.7	77.9
Virginia	82.3	8[illegible].5			

Negroes, the latter predominantly of rural nonfarm Negroes.[6] In the latter case, then, the higher infant mortality rates of the village and small town would apply.

The evidence of infant mortality rates presented here indicates that the urban rate for the country as a whole has been genuinely reduced relative to the rural, although there is considerable variation among the States in this respect. It is also apparent that towns and villages of 2,500 to 10,000 population present the least favorable record of infant mortality, as compared with cities or with areas of less than 2,500 population.

The reduction in infant mortality which has taken place in cities has probably been due largely to increasing emphasis being placed on the principles of sanitation, to the establishment of well-baby clinics, to increasing use of hospitals for delivery, to compulsory pasteurization of milk, and to the application of modern medical knowledge. Greater extension of such public health practices to town and rural communities should result in a material reduction of infant mortality.

ORNITHODOROS PARKERI AND RELAPSING FEVER SPIROCHETES IN SOUTHERN IDAHO [1]

By GORDON E. DAVIS, *Senior Bacteriologist, United States Public Health Service*

A. L. Burroughs, of Twin Falls, Idaho, forwarded on June 21, 1941, to the Rocky Mountain Laboratory 10 specimens of *Ornithodoros parkeri* collected from a ground squirrel burrow about 7 miles south of Twin Falls. This was the first collection of ticks of this species in Idaho. In August and September 52 additional lots of *O. parkeri*,

[6] Fifteenth Census of the United States 1930. Population, Vol. II, Chap. 10, table 31.

[1] Contribution from the Rocky Mountain Laboratory of the Division of Infectious Diseases, National Institute of Health.

ranging from 1 to 210 ticks, with a total of 1,466, were collected in Twin Falls, Cassia County, and Power County. Of this collection, 1,298 ticks survived for testing for spirochetes by feeding on white mice.

The number of ticks tested on one mouse depended on the size of the ticks. In the case of early nymphs a relatively large number were used, while only a few late stage nymphs or adults could be safely allowed to engorge.

TABLE 1.—*Ornithodoros parkeri and relapsing fever spirochetes in southern Idaho*

Accession No.	County	Date collected (1941)	Number of ticks		Sublots		Collectors
			Collected	Tested	Positive	Negative	
18882	Twin Falls	June 21	10	10	1	3	Burroughs.
19002	do	Aug. 2	11	11	1	3	Kohls and Burroughs
18901	do	Aug. 17	194	184	7	10	Burroughs.
18902	do	Aug. 10	2	2	0	1	Davis, Luke, and Kanarr.
18903	do	do	9	9	1	0	Do.
18904	do	do	3	3	0	1	Do.
18905	do	do	3	3	0	1	Do.
18906	do	do	10	10	1	0	Do.
18908	do	do	15	12	0	2	Do.
18909	do	do	210	209	26	5	Do.
18910	do	Aug. 20	69	66	4	2	Davis, Luke, and Burroughs.
18911	do	do	83	76	2	5	Do.
18912	do	do	13	13	0	1	Do.
18913	do	do	1	1	0	1	Do.
18914	do	do	18	17	1	0	Do.
18915	do	do	15	15	1	2	Do
18916	do	do	3	2	1	1	Do.
18917	do	do	14	14	1	2	Do
18918	do	do	164	128	4	1	Do.
18919	do	do	87	84	3	10	Do.
18920	do	do	67	38	1	4	Do
18921	do	do	62	44	1	2	Do.
18922	do	do	12	10	1	0	Do
18923	do	do	22	18	1	1	Do
19058	do	do	42	39	2	2	Do.
19059	do	do	46	37	2	2	Do
19060	do	do	18	18	0	2	Do
19061	do	do	40	33	1	2	Do
19062	do	do	9	9	1	0	Do.
19063	do	do	11	11	0	1	Davis and Burroughs.
19064	do	do	3	2	0	1	Do.
19065	do	do	8	7	1	0	Do.
19066	do	do	2	2	0	1	Do
19067	do	do	9	8	0	1	Do
19068	do	do	5	5	1	0	Do
19069	do	do	17	17	0	2	Do.
19070	do	do	27	17	0	1	Do.
19071	do	do	32	22	0	3	Do
19072	do	do	24	24	0	2	Do.
19073	do	do	3	3	0	1	Do
19074	do	do	2	2	0	1	Do.
19075	do	do	1	1	0	1	Do
19076	do	do	1	1	0	1	Do.
19077	do	do	11	11	0	3	Do.
19078	do	do	24	21	2	1	Do
19081	Cassia	Aug. 21	2	2	0	1	Davis.
19083	do	do	3	3	0	1	Do
19084	Power	do	13	13	0	1	Do.
19814	Twin Falls	Sept. 26	3	2	0	1	Do.
19815	do	do	5	4	1	1	Do.
19816	do	do	1	1	0	1	Do.
19817	do	do	3	3	0	1	Do.
19818	do	do	4	1	0	1	Do
Total			1,466	1,298	69	94	

A. L. Burroughs, Bureau of Entomology and Plant Quarantine.
Glen M. Kohls, associate entomologist, Rocky Mountain Laboratory.
H. C. Luke, bacteriologist, South Central District Health Unit, Twin Falls, Idaho.
John B. Kanarr, bacteriologist, South Central District Health Unit, Twin Falls, Idaho.

Beginning on the fifth day after tick feeding, tail blood was examined on 4 successive days unless spirochetes were recovered earlier. Thick blood preparations were stained by Giemsa's method.

Of 163 sublots tested, 69 transmitted spirochetes. One lot of 209 ticks tested in 31 sublots resulted in 26 positives.

A tabulation of all data is presented in table 1.

DISCUSSION

In the general area south of Twin Falls much of the arable land is under cultivation but there are numerous interspersed small tracts that are untilled. In such places ground squirrel and prairie dog burrows are numerous, and in some of the latter fecal pellets and feathers of burrowing owls were present. These were the most heavily tick-infested areas. Further examinations of ground squirrel burrows were made to the east, south, and west. To the east, 5 specimens were collected in Cassia County and 13 in Power County. Spirochetes were not recovered. Studies to the west toward Boise and on two occasions toward the south to the Nevada State border were made in September. In these areas the terrain and vegetation are markedly different from the Twin Falls area. A number of *Ixodes* sp. were collected north of the Nevada-Idaho State line but *O. parkeri* was not found, although this species appears again in the contiguous county (Elko) in Nevada.

SUMMARY

In a relatively restricted area in southern Idaho there is a very heavy infestation of *Ornithodoros parkeri* in ground squirrel and prairie dog burrows and an unusually high incidence of spirochetes.

Of a total of 1,466 ticks collected, 1,298 were tested in 163 sublots, 69 of which were positive for spirochetes.

This is the heaviest infestation of *O. parkeri* thus far encountered in any one area in the nine States (Wyoming, Colorado, Utah, Montana, Washington, Oregon, Nevada, California, and Idaho) in which this species has been collected, with the possible exception of an isolated area in central California. The number of spirochete strains recovered far exceeds all others.

Relapsing fever has not been reported from this area.

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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

August 16–September 12, 1942

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended September 12, 1942, the number reported for the corresponding period in 1941, and the median number for the years 1937–41.

DISEASES ABOVE MEDIAN PREVALENCE

Influenza. The number of cases (1,974) of influenza was about 80 percent of the number reported during this period in 1941, but it represented an excess of more than 20 percent over the preceding 5-year average incidence. The lowest incidence of this disease normally occurs during the month of August and while the number of cases was slightly higher during the current period than it was during the preceding 4-week period, for the country as a whole there was nothing to indicate more than the expected seasonal rise.

Meningococcus meningitis.— The incidence of meningococcus meningitis continued considerably above the level of recent years. There were 187 cases reported for the four weeks ended September 12, as compared with 122 cases in 1941, which figure also represents the 1937–41 median incidence for this period. Each region, except the East South Central, West South Central, and Mountain regions reported an excess over the normal seasonal expectancy.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—For the four weeks ended September 12 there were 951 cases of diphtheria reported, as compared with 964 cases in 1941 and an average of 1,446 cases for the corresponding period in the years 1937–41. The incidence in the West North Central, South Atlantic, and Pacific regions was considerably above that recorded in 1941, but the number of cases in each region was below the normal seasonal expectancy.

Measles.— All sections of the country showed a continued seasonal decrease of measles during the four weeks ended September 12. The number of cases reported (2,605) was less than 70 percent of the incidence in 1941 and about 90 percent of the 1937–41 average incidence for this period. In the New England, West North Central, and Pacific regions the number of cases was comparatively high,

but in all other regions the disease was less prevalent than in preceding years.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period Aug. 16–Sept. 12, 1942, the number for the corresponding period in 1941, and the median number of cases reported for the corresponding period, 1937–41

Division	Current period	1941	5-year median	Current period	1941	5-year median	Current period	1941	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	951	964	1,446	1,974	2,387	1,561	2,605	3,884	2,972
New England	12	14	17	13	0	3	423	423	280
Middle Atlantic	51	68	84	32	14	22	381	809	809
East North Central	114	91	159	95	89	121	456	631	631
West North Central	57	80	90	34	51	51	193	184	166
South Atlantic	344	300	466	859	608	608	139	702	240
East South Central	135	187	232	102	70	70	83	130	118
West South Central	150	154	196	563	1,270	450	106	418	126
Mountain	40	38	52	204	192	98	217	207	184
Pacific	48	32	68	72	93	67	607	380	364
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	187	122	122	847	2,370	2,370	2,740	2,388	3,148
New England	16	7	7	33	110	30	298	213	142
Middle Atlantic	55	22	23	181	616	390	421	429	455
East North Central	19	19	18	261	336	484	652	551	918
West North Central	14	6	11	106	111	209	283	255	343
South Atlantic	42	33	23	74	526	130	367	322	329
East South Central	15	15	15	80	545	88	350	194	243
West South Central	9	8	11	49	42	55	113	113	171
Mountain	4	4	8	18	27	42	89	89	116
Pacific	13	8	6	45	57	143	167	222	253
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [3]		
United States	16	19	89	887	1,356	2,141	11,672	12,552	[3] 11,761
New England	0	0	0	34	35	38	1,233	765	738
Middle Atlantic	0	0	0	130	168	168	2,988	2,228	2,940
East North Central	3	7	28	102	158	315	4,025	3,793	3,379
West North Central	4	6	21	59	72	144	519	885	651
South Atlantic	1	2	2	188	300	383	939	1,475	1,386
East South Central	1	2	2	142	256	311	408	483	447
West South Central	3	1	5	168	275	449	527	631	648
Mountain	3	0	7	43	40	78	330	979	535
Pacific	1	1	11	21	52	86	703	1,313	983

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.
[2] Mississippi excluded.
[3] Four years (1938–41) only.

Poliomyelitis.—The number of cases of poliomyelitis rose from 570 during the preceding 4-week period to 847 during the current period. The highest incidence was reported from Illinois, 130 cases; New York, 82; New Jersey, 81; Ohio, 50; Michigan, 45; California, 40; Tennessee, 32; Indiana and Kentucky, 28 each; and Nebraska, 27 cases. In the South Central regions the number of cases dropped from 194 cases during the preceding four weeks to 129 during the current period; although each of the other regions reported an increase, none of these was greater than might be expected at this season of the

year. Compared with preceding years the incidence was only about 35 percent of the 1937–41 average incidence for this period which is represented by the 1941 figure (2,370 cases). Each section of the country, except the New England, reported a relatively low incidence.

Scarlet fever.—Since 1935 there has been a gradual decline in the number of cases of scarlet fever, but for the current period the number of cases reported was approximately 20 percent above the 1941 figure for this period. The number of cases (2,740) was, however, still considerably below the preceding 5-year average incidence. The excess over last year was due largely to an increase in the number of cases in the New England, South Atlantic, and East South Central regions. These three regions alone reported excesses over the 1937–41 average incidence, all other regions reporting very significant declines.

Smallpox.—The incidence of smallpox stood at the preceding 4-week level. The number of cases (16) reported during each of the 4-week periods was the lowest number on record for any 4-week period. The average expectancy for this period was 89 cases and to further emphasize the current low incidence in 1929, 1930, and 1931 the cases for this period totaled 753, 660, and 405, respectively.

Typhoid and paratyphoid fever.—The incidence of typhoid fever was also the lowest on record for this period, the number of cases (887) being less than 70 percent of the 1941 figure and slightly more than 40 percent of the 1937–41 median incidence for this period. Each section of the country shared in the favorable situation of this disease that now exists.

Whooping cough.—The number of cases (11,672) of whooping cough was about 10 percent less than the 1941 figure for this period and slightly below the average incidence for the four preceding years. The incidence was particularly high in the New England and East North Central regions, about normal in the Middle Atlantic region, and relatively low in all other regions.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the four weeks ended September 12, based on data received from the Bureau of the Census, was 10.2 per 1,000 inhabitants (annual basis). The average rate for this period in the three preceding years was 10.1.

DEATHS DURING WEEK ENDED SEPTEMBER 19, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 19, 1942	Corresponding week 1941
Data from 87 large cities of the United States:		
Total deaths	7,756	7,238
Average for 3 prior years	7,494	
Total deaths, first 37 weeks of year	307,912	311,088
Deaths per 1,000 population, first 37 weeks of year, annual rate	11.7	11.8
Deaths under 1 year of age	610	504
Average for 3 prior years	497	
Deaths under 1 year of age, first 37 weeks of year	20,922	19,304
Data from industrial insurance companies:		
Policies in force	65,022,250	64,464,679
Number of death claims	10,201	11,023
Death claims per 1,000 policies in force, annual rate	8.2	8.9
Death claims per 1,000 policies, first 37 weeks of year, annual rate	9.2	9.6

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED SEPTEMBER 26, 1942

Summary

The number of cases of poliomyelitis declined from 229 for the preceding week to 220, and meningococcus meningitis decreased from 43 to 39 cases. The incidence of poliomyelitis is less than one-half that for the corresponding week of each of the preceding five years with the exception of 1938, while the incidence of meningococcus meningitis is above that for any other year since 1937.

Increases were recorded in the number of reported cases of diphtheria, influenza, measles, and scarlet fever, although of these diseases only influenza is above the 5-year (1937–1941) median. The current incidence of influenza is above that for the corresponding week of each of the preceding 5 years except 1941, but of the 746 cases reported, 231 cases occurred in Texas and 210 in South Carolina, or approximately 60 percent in these two States.

Other reports include 1 case of psittacosis in New York, 28 cases of amebic, 2,785 cases of bacillary (2,535 in Kansas)[1], and 196 cases of unspecified dysentery, 18 cases of infectious encephalitis, 6 cases of Rocky Mountain spotted fever, 5 cases of smallpox, 9 cases of tularemia, and 145 cases of endemic typhus fever (42 in Georgia, 38 in Texas, 22 in Alabama, and 20 in Florida). A total of 2,509 cases of endemic typhus fever has been reported to date in 1942, as compared with a total of 2,784 for the entire year 1941, 1,882 in 1940, and an annual 5-year (1937–41) median of 2,784.

The death rate for the current week for 88 large cities in the United States is 10.7 per 1,000 population, as compared with 10.9 for the preceding week and a 3-year average of 10.5. The cumulative rate to date is 11.6, as compared with 11.7 for the same period in 1941.

[1] At Newton, caused by contaminated water supply. Cases all occurred between September 2 and 14; no cases have been reported there since the latter date. Source of pollution reported to have been eliminated.

Telegraphic morbidity reports from State health officers for the week ended September 26, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that although none were reported, cases may have occurred

Division and State	Diphtheria			Influenza			Measles			Meningitis meningococcus		
	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41
	Sept 26, 1942	Sept 27, 1941		Sept 26, 1942	Sept 27, 1941		Sept 26, 1942	Sept 27, 1941		Sept 26, 1942	Sept 27, 1941	
NEW ENGLAND												
Maine	0	0	1				3	18	9	1	1	0
New Hampshire	0	0	0				0	1	1	1	0	0
Vermont	0	0	0				11	3	2	0	0	0
Massachusetts	4	2	2				35	53	27	3	1	1
Rhode Island	5	3	0				1	1	0	0	0	0
Connecticut	2	2	1	5		1	[illegible]	8	3	0	1	0
MID ATL												
New York	5	6	11	[1]6		[1]5	30	48	48	5	5	4
New Jersey	0	1	3	3	3	3	44	27	20	1	1	0
Pennsylvania	7	12	12		2		24	67	67	1	2	3
E NO CEN												
Ohio	3	8	9	3	5	2	19	22	8	1	0	0
Indiana	9	9	13	16	11	11	10	3	3	0	0	0
Illinois	15	8	20	5	3	5	19	18	18	2	0	1
Michigan [2]	0	5	6	2		2	18	38	28	2	0	1
Wisconsin	0	0	2	14	27	28	25	23	27	0	0	0
W NO CEN												
Minnesota	2	2	3		2		6	8	8	1	0	0
Iowa	6	0	2				10	6	3	0	0	0
Missouri	9	20	14	1		1	8	3	3	1	1	0
North Dakota	0	2	2	1		2	0	11	4	0	0	0
South Dakota	4	13	4				0	1	1	0	1	0
Nebraska	3	1	3	2			15	4	3	1	0	0
Kansas	1	1	3	4	1	1	1	8	5	1		1
SO ATL												
Delaware	1	1	0				0	2	2	0	0	0
Maryland [2]	3	4	4	4	2	2	2	7	5	2	0	1
Dist of Col	1	0	2				1	3	1	0	0	0
Virginia	16	16	35	74	41	40	3	28	10	3	3	1
West Virginia	9	0	10	1		7	2	23	5	2	0	1
North Carolina	47	69	103				4	41	26	0	0	0
South Carolina	27	44	36	210	185	157		18	2	1	3	1
Georgia	51	38	38	2	20	11	6	19	11	0	1	0
Florida	7	6	9	1	16	3	2	2	1	0	1	1
E SO CEN												
Kentucky	11	12	19	2		2	4	11	11	0	0	2
Tennessee	13	19	23	12	7	17	2	20	10	0	0	2
Alabama	28	40	43	15	4	9	11	7	7	2	0	1
Mississippi [2]	7	11	15							1	0	0
W SO CEN												
Arkansas	17	15	15	8	23	13	0	18	2	0	1	0
Louisiana	10	6	13	1	12	3	5	0	1	1	1	0
Oklahoma	8	12	9	9	17	17	2	31	1	1	0	0
Texas	36	32	33	231	350	71	9	15	8	1	2	2
MOUNTAIN												
Montana	1	7	1	1	8		3	14	14	0	0	0
Idaho	0	0	0				5	2	2	0	0	0
Wyoming	0	0	0	30	4		7	0	2	0	0	0
Colorado	1	4	7	24	55		5	9	6	0	1	1
New Mexico	1	0	2	2			1	6	4	0	1	0
Arizona	1	1	1	25	36	33	8	29	4	0	0	0
Utah [2]	0	0	0			2	36	2	4	0	0	0
Nevada	0	0					0	0		1	0	---
PACIFIC												
Washington	1	0	2	2	12		42	4	8	1	0	0
Oregon	0	0	2	2	16	11	26	15	7	0	0	0
California	13	12	14	28	14	14	49	75	54	2	0	0
Total	385	444	553	746	876	471	524	772	668	39	27	28
38 weeks ...	8,926	9,280	14,199	83,811	493,526	162,383	469,401	827,670	350,598	2,623	1,571	1,571

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 26, 1942, and comparison with corresponding week of 1941 and 5-year medium—Continued

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Sept. 26, 1942	Sept. 27, 1941		Sept. 26, 1942	Sept. 27, 1941		Sept. 26, 1942	Sept. 27, 1941		Sept. 26, 1942	Sept. 27, 1941	
NEW ENG.												
Maine	2	5	1	7	6	2	0	0	0	0	0	1
New Hampshire	0	0	0	5	1	1	0	0	0	0	0	0
Vermont	2	0	0	3	2	2	0	0	0	0	1	0
Massachusetts	1	15	7	75	68	40	0	0	0	13	1	1
Rhode Island	0	1	0	4	2	2	0	0	0	0	0	0
Connecticut	4	12	4	7	13	13	0	0	0	1	2	2
MID. ATL.												
New York	22	115	61	85	93	92	0	0	0	11	31	20
New Jersey	17	29	21	33	31	31	0	0	0	1	9	9
Pennsylvania	8	66	50	72	53	106	0	0	0	9	16	17
E. NO. CEN.												
Ohio	13	42	28	79	81	89	0	0	0	9	12	12
Indiana	3	10	10	28	7	27	1	0	0	6	2	5
Illinois	50	31	31	61	65	104	0	0	0	12	13	21
Michigan [2]	13	26	53	44	55	84	0	1	1	0	4	11
Wisconsin	2	8	8	49	52	60	0	0	0	4	2	2
W. NO. CEN.												
Minnesota	5	16	25	26	20	34	0	0	1	0	0	4
Iowa	3	0	5	34	26	26	0	0	0	3	0	3
Missouri	1	4	4	12	19	19	0	0	0	14	20	14
North Dakota	2	0	0	4	1	6	0	0	1	0	0	0
South Dakota	0	2	2	11	4	6	0	0	0	0	0	0
Nebraska	10	8	7	7	12	6	0	0	0	0	0	1
Kansas	11	2	3	12	44	44	0	0	0	0	3	5
SO. ATL.												
Delaware	1	4	0	1	10	2	0	0	0	1	0	1
Maryland [3]	2	15	2	14	23	19	0	0	0	3	17	13
Dist. of Col.	1	3	2	14	6	7	0	0	0	1	4	1
Virginia	4	8	4	38	25	21	0	0	0	10	18	18
West Virginia	6	4	3	37	45	45	0	0	0	9	17	17
North Carolina	1	10	2	62	46	58	0	0	0	6	9	9
South Carolina	2	11	1	8	18	10	0	0	0	5	14	14
Georgia	1	17	1	37	26	26	0	0	0	12	4	15
Florida	2	9	2	2	7	3	0	0	0	1	4	4
E. SO. CEN.												
Kentucky	2	6	6	28	47	47	1	0	0	4	14	18
Tennessee	6	39	1	45	43	43	0	0	0	11	12	14
Alabama	3	35	1	36	27	26	0	0	0	4	10	10
Mississippi [2]	0	3	1	3	9	9	0	0	0	6	6	4
W. SO. CEN.												
Arkansas	5	1	1	7	1	9	2	0	0	11	4	18
Louisiana	1	4	4	3	1	6	0	0	0	9	5	17
Oklahoma	0	2	2	12	12	15	0	0	0	7	4	12
Texas	1	4	4	17	22	22	0	1	0	17	13	45
MOUNTAIN												
Montana	0	0	2	5	7	13	0	0	2	0	1	1
Idaho	0	1	1	5	7	8	0	0	0	0	2	2
Wyoming	0	0	1	1	1	1	0	0	0	1	0	0
Colorado	4	1	1	5	21	13	1	0	0	8	0	7
New Mexico	2	0	1	3	1	2	0	0	0	1	6	6
Arizona	1	0	0	0	1	2	0	0	0	0	0	1
Utah [2]	0	3	2	4	3	4	0	0	0	0	1	1
Nevada	0	0	------	0	0	------	0	0	------	0	0	------
PACIFIC												
Washington	2	4	4	19	21	16	0	0	0	6	4	6
Oregon	0	5	3	5	6	7	0	0	0	1	7	7
California	4	10	13	41	59	67	0	0	2	1	7	9
Total	220	591	591	1,110	1,150	1,270	5	2	31	218	299	444
38 weeks	2,618	6,389	6,320	93,331	93,965	121,178	639	1,175	8,283	5,137	6,405	9,662

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 26, 1942—Continued

Division and State	Whooping cough, Week ended Sept. 26, 1942	Whooping cough, Week ended Sept. 27, 1941	Week ended Sept. 26, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	50	35	0	0	0	0	0	0	0	0	0
New Hampshire	5	2	0	0	0	0	0	0	0	0	0
Vermont	26	7	0	0	0	0	0	0	0	0	0
Massachusetts	194	109	0	0	3	0	1	0	0	0	0
Rhode Island	32	33	0	0	0	0	0	0	0	0	0
Connecticut	55	31	0	0	1	0	1	0	0	0	0
MID. ATL.											
New York	351	343	0	7	42	0	1	0	0	0	0
New Jersey	168	159	0	0	1	0	0	0	0	0	0
Pennsylvania	205	173	0	0	1	0	0	0	1	0	0
E. NO. CEN.											
Ohio	220	269	0	0	2	0	1	0	0	0	0
Indiana	18	19	0	0	0	0	0	0	0	0	0
Illinois	226	185	0	1	4	0	0	0	0	0	0
Michigan [3]	311	319	0	0	17	0	0	0	0	0	0
Wisconsin	199	265	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	49	70	0	0	3	0	0	0	0	1	0
Iowa	37	21	0	0	0	0	3	0	0	0	0
Missouri	6	18	0	0	0	0	0	0	0	0	0
North Dakota	15	33	0	0	0	0	2	0	0	0	0
South Dakota	0	14	0	0	0	0	3	0	0	0	0
Nebraska	8	24	0	0	0	0	0	0	0	0	0
Kansas	33	50	0	0	2,535	0	2	0	0	0	0
SO. ATL.											
Delaware	2	3	0	0	0	0	0	0	0	0	0
Maryland [3]	70	36	0	0	0	14	1	0	1	0	1
Dist. of Col.	17	24	0	0	0	0	0	0	0	0	1
Virginia	34	45	0	1	0	145	0	0	1	0	2
West Virginia	6	25	0	0	0	0	0	0	0	0	0
North Carolina	45	103	0	0	0	0	0	0	2	0	2
South Carolina	37	94	0	0	8	0	0	0	0	0	7
Georgia	16	10	0	1	0	0	0	0	0	0	42
Florida	6	24	0	1	2	0	0	0	0	0	20
E. SO. CEN.											
Kentucky	40	79	0	0	3	0	0	0	0	0	0
Tennessee	13	20	0	0	0	9	0	0	0	0	2
Alabama	33	14	0	1	0	0	1	0	1	0	22
Mississippi [2]	------	------	0	0	0	0	0	0	0	0	2
W. SO. CEN.											
Arkansas	10	20	0	6	26	0	0	0	0	3	0
Louisiana	0	7	0	1	0	0	0	0	0	0	5
Oklahoma	2	14	0	0	0	0	0	0	0	0	0
Texas	68	99	0	6	111	0	1	0	0	2	38
MOUNTAIN											
Montana	23	3	0	0	0	0	1	0	0	0	0
Idaho	10	6	0	0	0	0	0	0	0	0	0
Wyoming	28	6	0	0	0	0	0	0	0	2	0
Colorado	35	62	0	0	6	0	0	0	0	0	0
New Mexico	8	24	0	0	8	0	0	0	0	0	0
Arizona	15	13	0	0	0	28	0	0	0	0	0
Utah [3]	21	19	0	0	0	0	0	0	0	0	0
Nevada	0	1	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	17	50	0	1	0	0	0	0	0	0	0
Oregon	8	19	0	0	0	0	0	0	0	0	0
California	170	202	0	3	12	0	0	0	0	1	1
Total	2,942	3,201	0	29	2,785	196	18	0	6	9	145
38 weeks	136,936	162,495	------	------	------	------	------	------	------	------	------

[1] New York City only.

[3] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended Sept 12, 1942

This table lists the reports from 88 cities of more than 10 000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	4	0	4	0	0	0	0	0	2	0	0	1
Baltimore, Md	0	0	1	1	4	4	7	0	5	0	1	30
Barre, Vt	0	0		0	0	0	0	0	0	0	0	3
Billings, Mont	0	0		0	0	0	0	0	1	0	0	3
Birmingham, Ala	1	0	2	1	0	0	1	0	8	0	0	4
Boston, Mass	0	0		0	4	0	5	1	18	0	0	47
Bridgeport, Conn	0	0		0	0	0	2	0	3	0	0	2
Brunswick, Ga	0	0		0	0	0	0	0	1	0	0	0
Camden, N J	2	0		0	0	0	1	0	0	0	0	4
Charleston, S C	1	1		0	0	0	0	1	0	0	0	0
Charleston W Va	0	0	2	0	0	0	0	0	1	0	0	0
Chicago Ill	9	0	2	1	7	0	14	15	13	0	3	191
Cincinnati Ohio	0	0	3	1	1	1	1	1	4	0	0	10
Cleveland, Ohio	0	0	6	1	2	0	3	3	20	0	1	29
Columbus, Ohio	0	1	1	1	0	0	0	0	11	0	0	8
Concord, N H	0	0		0	0	0	0	0	1	0	0	0
Cumberland, Md	0	0		0	0	0	0	0	0	0	0	0
Dallas Tex	0	0		0	0	0	3	1	0	0	0	3
Denver, Colo	6	0	8	0	0	0	1	0	3	0	0	3
Detroit, Mich	2	0	1	1	1	0	6	3	13	0	1	84
Duluth, Minn	0	0		0	0	0	1	0	0	0	0	4
Fall River, Mass	3	0		0	0	0	0	0	1	0	0	1
Fargo, N Dak	0	0		0	0	0	0	1	0	0	0	0
Flint, Mich	0	0		0	0	0	1	0	1	0	0	13
Fort Wayne Ind	0	0		0	0	0	2	0	0	0	0	0
Frederick Md	0	0		0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	-	0	0	0	3	0	0	0	0	0
Grand Rapids, Mich	0	0		0	1	0	0	1	0	0	0	1
Great Falls, Mont	0	0		0	0	0	0	0	0	0	0	2
Hartford, Conn	0	0		0	1	0	0	2	2	0	0	14
Helena, Mont	0	0		0	0	0	0	0	0	0	0	0
Houston, Tex	1	0		0	0	0	2	0	0	0	1	3
Indianapolis, Ind	0	0		0	0	0	5	4	1	0	0	12
Kansas City, Mo	0	0		0	2	0	0	0	1	0	0	0
Kenosha, Wis	0	0		0	0	0	0	0	1	0	0	10
Little Rock Ark	0	0		0	0	0	3	0	0	0	0	0
Los Angeles Calif	3	0	2	0	6	0	3	3	8	0	0	20
Lynchburg, Va	1	0		0	1	0	1	0	0	0	0	3
Memphis, Tenn	0	0	1	0	2	0	3	1	2	0	1	26
Milwaukee, Wis	0	0		0	4	0	0	0	6	0	0	40
Minneapolis, Minn	0	0		1	1	0	0	3	3	0	0	1
Missoula, Mont	0	0		0	0	0	0	0	0	0	0	1
Mobile, Ala	0	0		0	0	0	1	0	0	0	0	0
Nashville, Tenn	0	0		2	0	0	0	0	1	0	0	1
Newark, N J	0	0	4	0	3	1	3	3	5	0	0	20
New Haven, Conn	0	0		0	2	0	1	0	2	0	1	10
New Orleans, La	0	0		0	0	0	4	0	2	0	4	1
New York, N Y	5	0	2	0	6	5	32	11	28	0	8	109
Omaha, Nebr	1	0		0	0	0	2	0	0	0	0	6
Philadelphia Pa	0	0	1	0	5	1	11	1	12	0	6	107
Pittsburgh, Pa	1	0		1	4	0	4	2	0	0	3	15
Portland, Maine	0	0		0	3	0	0	0	1	0	0	16
Providence, R I	1	0	--	0	2	1	0	0	1	0	1	2

City reports for week ended Sept. 12, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Pueblo, Colo	0	0	------	0	0	0	1	0	0	0	0	0
Racine, Wis	0	0	------	0	0	0	0	0	6	0	0	8
Raleigh, N. C	0	0	------	0	1	0	1	0	0	0	0	0
Reading, Pa	0	0	------	0	0	0	1	0	0	0	0	8
Richmond, Va	1	0	------	0	0	0	2	0	0	0	0	1
Roanoke, Va	0	0	------	0	0	0	0	0	0	0	0	0
Rochester, N. Y	0	0	------	0	0	0	2	2	3	0	0	11
Sacramento, Calif	0	0	------	0	1	0	0	0	2	0	0	0
Saint Joseph, Mo	0	0	------	0	0	0	0	0	0	0	0	0
Saint Louis, Mo	0	1	------	0	1	1	7	4	2	0	0	3
Saint Paul, Minn	0	0	------	0	0	0	0	0	2	0	0	25
Salt Lake City, Utah	0	0	------	0	3	0	1	0	0	0	0	4
San Antonio, Tex	0	0	------	0	0	0	0	0	1	0	0	1
San Francisco, Calif	0	0	------	6	7	0	4	0	1	0	0	6
Savannah, Ga	0	0	------	0	0	0	0	0	1	0	0	2
Seattle, Wash	0	0	------	0	1	0	3	0	0	0	0	3
Shreveport, La	0	0	------	0	1	0	0	0	0	0	0	0
South Bend, Ind	0	0	------	0	3	0	0	0	1	0	0	0
Spokane, Wash	0	0	------	0	4	0	1	0	3	0	0	1
Springfield, Ill	0	0	------	0	0	0	1	1	1	0	0	12
Springfield, Mass	0	0	------	0	1	0	1	0	2	0	0	2
Superior, Wis	0	0	------	0	0	0	0	0	2	0	1	3
Syracuse, N. Y	0	0	------	0	0	0	1	0	0	0	1	23
Tacoma, Wash	0	0	------	0	2	0	1	0	2	1	0	2
Tampa, Fla	0	0	------	0	0	0	0	0	0	0	0	0
Terre Haute, Ind	1	0	------	0	0	0	1	0	1	0	0	0
Topeka, Kans	0	0	------	0	0	0	0	0	3	1	0	0
Trenton, N. J	0	0	------	0	0	0	5	0	2	0	0	0
Washington, D. C	4	0	------	0	4	1	8	0	6	0	0	26
Wheeling, W. Va	0	0	------	0	0	0	0	0	1	0	0	0
Wichita, Kans	0	0	------	0	1	0	4	0	0	0	0	6
Wilmington, Del	0	0	------	0	0	0	0	0	0	0	0	0
Wilmington, N. C	0	0	------	0	0	0	0	0	1	0	0	3
Winston-Salem, N. C	0	0	------	0	0	0	1	0	0	0	0	3
Worcester, Mass	0	0	------	0	1	0	3	0	9	0	0	21

Anthrax—Cases: New Orleans, 1; Philadelphia, 1.
Dysentery, amebic—Cases: New York, 2.
Dysentery, bacillary—Cases: Columbus, 1; Detroit, 4; Little Rock, 1; Los Angeles, 5; New Haven, 1; New York, 4; Philadelphia, 5; Richmond, 2; St. Louis, 1.
Dysentery, unspecified—Cases: San Antonio, 1.
Rocky Mountain spotted fever—Cases: Nashville, 1.
Typhus fever—Cases: Atlanta, 1; Charleston, S. C., 1; Galveston, 2; Houston, 1; New York, 1; Philadelphia, 1; Savannah, 5; Shreveport, 1; Tampa, 1.

Rates (annual basis) per 100,000 population, for the group of 88 cities in the preceding table (estimated population, 1942, 33,530,497)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Week ended Sept. 12, 1942	7.44	6.22	1.71	14.46	27.37	36.39	0.31	5.13	159.71
Average for week 1937-41	10.06	5.97	1.41	[1] 21.38	38.04	37.25	0.31	9.59	178.88

[1] Median.

PLAGUE INFECTION IN MONTEREY COUNTY, CALIF.

Under date of September 16, 1942, plague infection was reported demonstrated in a pool of 200 fleas from 36 ground squirrels, *C. beecheyi*, taken August 6 from a ranch 16 miles south of Salinas, Monterey County, Calif., and in a pool of 4 ticks from 1 cottontail rabbit, *Sylvilagus* sp., taken August 7 from the Fort Ord Military Reservation, Area D.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended August 29, 1942.—During the week ended August 29, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				2		1			1	4
Chickenpox		1		23	35	3	9	8	48	127
Diphtheria		12	1	18	3	3	2		2	41
Dysentery	4	55		6	6		1		23	95
German measles					4				6	10
Influenza		7			7		4		5	23
Lethargic encephalitis							1		2	3
Measles				7	36	15	24		3	85
Mumps		25		14	72	14	18	4	35	182
Pneumonia	2	1			3				13	19
Poliomyelitis		9	11	16	7	2		1		46
Scarlet fever		5	2	32	21	3	7	13	23	106
Trachoma							1			1
Tuberculosis		6	14	80	55			13	18	186
Typhoid and paratyphoid fever		2	2	11	4		1		1	21
Undulant fever				1	2				2	5
Whooping cough		10	1	270	62	13	4	4	15	379
Other communicable diseases	3	14		1	287	44		2	6	357

SWEDEN

Notifiable diseases—July 1942.—During the month of July 1942, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	10	Scarlet fever	1,243
Diphtheria	67	Syphilis	25
Dysentery	102	Typhoid fever	4
Gonorrhea	1,370	Undulant fever	9
Paratyphoid fever	18	Weil's disease	3
Poliomyelitis	37		

SWITZERLAND

Notifiable diseases—May 1942.—During the month of May 1942, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	12	Mumps	125
Chickenpox	193	Paratyphoid fever	18
Diphtheria	100	Poliomyelitis	25
Dysentery	1	Scarlet fever	221
German measles	38	Tuberculosis	306
Influenza	20	Typhoid fever	9
Lethargic encephalitis	3	Undulant fever	11
Measles	1,153	Whooping cough	58

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Indochina—Laos.—During the period August 21–31, 1942, one fatal case of plague was reported in Laos, Indochina.

Typhus Fever

Algeria.—During the period August 1–10, 1942, 329 cases of typhus fever were reported in Algeria.

Morocco.—During the week ended August 29, 1942, 43 cases of typhus fever were reported in Morocco.

Tunisia.—During the period August 11–21, 1942, 172 cases of typhus fever were reported in Tunisia.

Yellow Fever

Sudan (French)—Koulikoro.—On September 10, 1942, one death from suspected yellow fever was reported in Koulikoro, French Sudan.

COURT DECISION ON PUBLIC HEALTH

Sexual sterilization—statute held unconstitutional.—(Washington Supreme Court; *In re Hendrickson*, 123 P.2d 322; decided March 5, 1942.) By a statute of Washington relating to sexual sterilization, superintendents of State institutions caring for individuals held in restraint had to report quarterly to the institutional board of health "all feeble-minded, insane, epileptic, habitual criminals, moral degenerates, and sexual perverts," potentially capable of producing offspring

who would probably become a social menace or wards of the State. If the board decided on sterilization it made an order directing the superintendent of the particular institution to perform or cause to be performed upon the inmate a sterilization operation. No provision was made for notice to an inmate of the hearing before the board nor was he afforded any opportunity to appear and present his defense at such hearing. However, the statute provided for service of the board's order in each of four situations, summarized by the Supreme Court of Washington in the instant case as follows:

> First, if the inmate is a criminal or feeble-minded person (more accurately, anyone within the statute not insane), the order of the board shall be served on the inmate. (There is no provision for service on a guardian or next of kin.) Second, in case of an insane person having a legal guardian, service shall be made on such guardian. Third, if an insane person has no legal guardian, then the order shall be served on his nearest known kin within the State (this was the situation of the inmate in the instant case). Fourth, if an insane person has no legal guardian and no known kin within the State, the order shall be served on the custodial guardian of the inmate.

The law also provided that an inmate or, in the case of a person under guardianship or disability, the guardian of the inmate could appeal from the board's order to the superior court within 15 days after receipt of notice of the board's decision by filing an informal notice of appeal with the board's secretary. In the superior court a trial de novo was afforded.

In the instant case the institutional board of health ordered that an insane inmate of a State hospital be sterilized and a copy of the order was served upon the inmate's father as the next of kin. The father's letter of protest was treated as a notice of appeal. The trial court permanently enjoined the hospital superintendent from carrying out the sterilization order and on appeal to the Supreme Court of Washington the principal question presented was whether the sterilization statute contravened (1) the due process clause of the fourteenth amendment to the Federal constitution which forbade any State to deprive any person of life, liberty, or property without due process of law and (2) the corresponding provision of the State constitution.

The supreme court said that the essential elements of the constitutional guaranty of due process, in its procedural aspect, were notice and an opportunity to be heard or defend before a competent tribunal in an orderly proceeding adapted to the nature of the case. With respect to situations one and four stated in the above quotation the appellate court was of the view that the provisions did not meet the requirements of due process. In the first situation involving a feebleminded inmate the entire burden and responsibility of initiating an appeal was placed upon a person held in confinement because of

mental incompetency. Very likely, said the court, he could not read the order served upon him, or, if he could, he would be incapable of comprehending its purport. In the last situation involving an insane person who had no guardian or known kin in the State it was pointed out that the custodial guardian, upon whom notice would be served, would be the superintendent of the hospital in which the inmate was held, which official was the one who started the proceedings by recommending to the institutional board of health that the inmate be sterilized and who would be charged with the duty of carrying out the board's order should sterilization be decreed. Also the head physician of each of the State hospitals was a member of the institutional board. "The statute places a superintendent in an impossible position however fair-minded and conscientious he may be."

The next matter to be disposed of by the supreme court was the contention that the inmate could not question the constitutionality of the notice provisions just discussed because they did not directly affect him. While the court said that it was the general rule that a person could not attack as unconstitutional a statute or provision thereof not applicable to his particular situation, it pointed out that the unconstitutionality of a part of a statute sometimes rendered the remainder legally inoperative and that persons affected by the remainder could question the constitutionality of the invalid part even though it did not apply to them, since that was an essential element in establishing that the remainder was legally inoperative as to them. The question then was—Would the legislature have passed the act with the objectionable portions eliminated? If such portions were stricken from the act all of the feeble-minded and a substantial number of the insane would be exempt from sterilization. It was the court's conclusion that the entire statute had to fall. While, said the court, the unconstitutional provisions and the inclusion of the kinds of defectives to which they pertain may not have been the sole inducement for the passage of the act, "yet they are so connected with and related to the rest of it and so important to its general plan and operation as a whole as to impel the conclusion that the legislature would not have passed the act without them."

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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Public Health Reports

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Public Health Reports

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CULTURAL CHARACTERISTICS OF ZOOGLEA-FORMING BACTERIA ISOLATED FROM ACTIVATED SLUDGE AND TRICKLING FILTERS [1]

By ELSIE WATTIE, *Associate Bacteriologist, United States Public Health Service, Stream Pollution Investigations, Cincinnati, Ohio*

The isolation of a zooglea-forming bacterium, tentatively designated as *Zooglea ramigera*, from activated sludge has been described by Butterfield (*3*), who also reviewed the literature relating to such bacteria and their functions in sewage purification. Publications of the series of "Studies of Sewage Purification" emanating from the Stream Pollution Investigations Station of the United States Public Health Service at Cincinnati, Ohio, and papers of other laboratories interested in the same field have presented a large amount of data on the function of this type of bacteria in sewage purification processes. Very little information has been produced concerning the bacterial characteristics essential for purposes of description or of identification of species.

The studies of Butterfield et al. (*4*) indicate that the floc-forming organisms present in activated sludge will develop under aeration an activated sludge in sterile synthetic or sterilized normal sewage. A pure culture sludge, developed by the fill-and-draw-method, will oxidize about 50 percent of the 5-day biochemical oxygen demand (B. O. D.) during a 5-hour aeration period.

The purification accomplished by a pure culture activated sludge and a normal activated sludge has been found to be very similar by Ruchhoft and his associates (*11*). The rate and extent of total purification accomplished during a given period is influenced by the quality and quantity of activated sludge and the substrate in the aeration mixture.

The distinctive characteristic of these bacteria which has been emphasized is that they have the ability to grow in a floc, or colony, in a liquid medium even when they are subjected to agitation produced by the aeration sufficient to maintain aerobic conditions. This

[1] From the Division of Public Health Methods, National Institute of Health.

floc-forming ability is dependent on a gelatinous matrix or caps... which can be demonstrated about each cell. This gelatinous coating of the individual cells apparently becomes the binding agent i... the floc.

The purpose of the gelatinous mass which binds the bacteria to... er is explained by Whitehead and O'Shaughnessy (*16*). From ...eir experiments they concluded that the fine particles floating in sew...e were held by the jelly-like mass and used by the bacteria either for food or as particles for attachment. Butterfield (*3*) used similar inorganic particles in his studies for bacterial floc attachment. However, the addition of cotton fibers or other inert particles for floc attachment in the development of pure culture sludges in synthetic sewage has been proven unnecessary. Within 48 hours after inoculating, well-developed flocs were formed in sterile synthetic sewage containing no inert material, as shown in figure 1. Microscopic examinations show the flocs are composed entirely of bacterial cells bound together by a gelatinous matrix.

The ability of zooglea-forming bacteria, isolated from activated sludge, to clarify sterile sewage either under aeration or while the sewage is quiescent has been studied by Heukelekian and Schulhoff (*9*). The characteristics of the organisms isolated are not given. Their results indicate that sterilized sewage inoculated with a floc-forming organism isolated from activated sludge will be clarified more quickly under aeration than when remaining quiescent. In either case, clarification did not exceed that of aerated raw sewage.

Dienert (*6*) isolated several types of bacteria from the zoogleal masses of activated sludge and trickling filters. He classified them as clarifying, reducing, and oxidizing organisms. The clarification of sewage was produced by a large coccus, but it was not obtained in pure culture. The rate of clarification was decreased after the sludge flocs had been mashed or pressed between glass slides and the zoogleal masses dispersed. The oxidizing zoogleal bacterium isolated was a small, Gram-negative coccus, enclosed in a jelly-like mass. This organism did not ferment sugar. Dienert was not successful in isolating from the zoogleal film the organism causing nitrification but reported the breaking down of NH_3 without the formation of HNO_3.

Heukelekian and Littman (*8*) isolated 14 zooglea-forming organisms from activated sludge. All the cultures appeared to be similar. Morphologically and culturally they were indistinguishable from the zoogleal bacteria isolated by Butterfield (*3*).

Gilcreas (*7*) stated that large rod-shaped zoogleal bacteria are present in sewage and the film on the stones of a trickling filter is composed principally of zoogleal and filamentous bacteria.

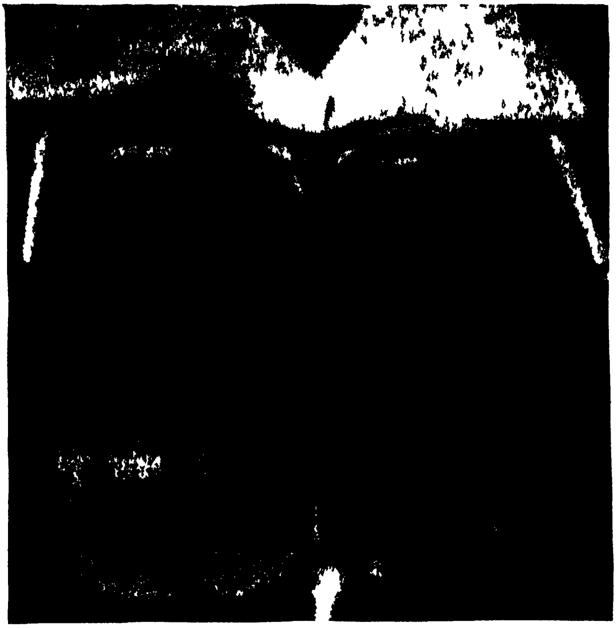

FIGURE 1 (a).—Eight liter culture bottles of synthetic sewage. Bottle on right sterile, bottle on left with 48 hour growth under aeration of zooglea

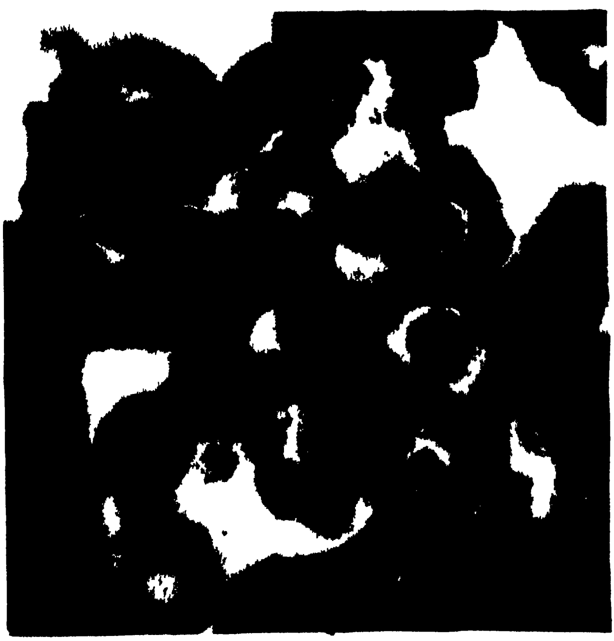

FIGURE 1 (b).—Floc of zoogleal culture, magnification 1426X

A floc-forming organism was isolated by Buswell and Suter (*2*) from flocs present in chlorinated water supplies of various Illinois cities. Microscopic examination showed that these flocs were composed of small capsulated cocci or small rods, 0.3 to 0.5 microns in diameter, and larger organisms as well as filamentous bacteria. The organism isolated was nonmotile and formed nitrates from ammonia. This would indicate that the organism is not related to the activated sludge or trickling filter floc-forming organisms being discussed here, but to the family of Nitrobacteriaecae isolated by Winogradsky.

A zooglea organism, Nitrocystis, has been isolated by Winogradsky (*17*) from activated sludge, as one of the dominant organisms and is mentioned by Bergey (*1*). Other writers have studied briefly and reported zoogleal growths in sewage purification processes. It appears that a number of strains, possibly types of zoogleal bacteria, have been isolated and studied to some extent. Bergey (*1*) in his "Manual of Determinative Bacteriology" lists one species, *Zooglea ramigera.* Intensive effort at the Stream Pollution Investigations Laboratory of the United States Public Health Service has been directed to the isolation and to the study of the cultural characteristics of the zoogleal bacteria found in activated sludge and in trickling filters.

METHODS OF ISOLATION OF ZOOGLEAL CULTURES

Two methods of isolating zoogleal organisms were followed. The first method was similar to the technique used by Butterfield (*3*)—repeated washing and "teasing" of a zoogleal floc picked from activated sludge, or the film washed from the stones of a trickling filter. Through the use of this method, question might arise as to the failure to select a predominant zoogleal floc from a sludge sample.

In the second procedure, the sample of sludge was mixed thoroughly and a 10 ml. portion was placed in a sterile 30 ml. glass-stoppered bottle containing sterile glass beads. If the sludge used was heavy and dense, it was diluted 1:10 with sterile dilution water before removing the portion to be shaken. The bottle was then shaken 10 minutes at high speed on a shaking machine, breaking up the zoogleal flocs and freeing the organisms previously held in the gelatinous masses. When portions of the shaken and unshaken sludge were examined microscopically, a marked difference was noted. A much greater number of free bacterial cells was observed in the shaken sample, but complete dispersion was not obtained since some small flocs remained.

The shaken sludge sample was planted in serial dilution in standard lactose broth as soon as possible after shaking. It has been observed that the bacterial cells freed from their gelatinous mass quickly unite

again if allowed to remain quiescent after shaking. Tubes were incubated 48 to 120 hours at 20° C. before examining for typical zoogleal flocs.

Upon examination, tubes of the highest dilution showing floc formation were used for further purification. Two types of flocs were observed—the fingered type and the round, solid, compact type. Plantings were made from these high dilution tubes, using standard nutrient agar diluted 1:3 with sterile dilution water. After 96 hours' incubation at 20° C., colonies were picked from the agar plates to standard lactose broth. Planting and picking from dilute agar was repeated several times to insure absolute purity of the culture. Tests were made to determine the ability of the isolated pure cultures to develop, under aeration, an activated sludge in sterile synthetic media of the same composition as used by Butterfield, Ruchhoft, and McNamee (*4*), and in sterilized domestic sewage.

Samples of activated sludge used in the isolation of zooglea-forming organisms were obtained from various sources. Activated sludges used were from the North and South plants at Lancaster, Pa., Calumet Sewage Treatment Works of the Sanitary District of Chicago, Ill., and the experimental activated sludge plant at this laboratory. Trickling filter zooglea-forming bacteria were isolated from film-covered stones picked from the experimental trickling filter at this laboratory and from the municipal trickling filters at Dayton, Ohio, and at Osgood, Ind.

The experimental trickling filter at the Stream Pollution Investigations Station was constructed in three sections to provide for sampling at various depths. The filter was fed settled domestic sewage at an average rate of 3 million gallons per acre per day. In this experimental unit zooglea-forming organisms were observed after the filter had been in operation about 48 hours.

Flocs were more numerous in the film washed from the stones taken from the top section than from the center or bottom sections. Fingerlike flocs appeared in the film covering the stones a few inches below the surface of an experimental contact filter after the filter had been in operation 7 days, being fed twice daily with raw domestic sewage.

The film-covered stones selected at random for examination were removed from the trickling filter with sterile forceps and placed in sterile petri dishes. Extraneous matter was washed gently from the surface of the stones with sterile dilution water. The attached film was then scraped from the stones and placed in a sterile bottle containing 20.0 ml. of sterile dilution water. During the period between removing the stones from the filter and scraping off the film, care was taken to keep the surface of the stones sufficiently moist to prevent drying of the film. When a portion of the washed film was examined microscopically, fingerlike flocs were observed, similar to those found

in activated sludge flocs. The same two methods were followed in the isolation of floc-forming organisms from the washed film of the trickling filter stones as were used for activated sludge.

The only zooglea-forming cultures retained for further study were those that would produce, under aeration sufficient to maintain aerobic conditions, an activated sludgelike floc in sterile synthetic sewage and in sterilized domestic sewage.

The purification efficiency of a pure culture sludge developed by the various zoogleal organisms isolated in sterile synthetic sewage or sterilized domestic sewage was measured by the total oxidizable material removed from the supernatant. This percentage of the 5-day biochemical oxygen demand of the oxidizable material present in the substrate after 3 or 5 hours of aeration has been calculated for some of the organisms studied.

Isolations of 14 zooglea-forming bacteria have been made from activated sludge and 4 from the films washed off stones taken from trickling filters. For convenience in comparison, the characteristics of the zooglea-forming organisms studied are summarized in table 1.

CULTURES ISOLATED FROM ACTIVATED SLUDGE

Culture 50 was isolated from sludge of the experimental activated sludge plant of the Stream Pollution Station, Cincinnati, Ohio. This culture was originally Z–1, reported by Butterfield (*3*) and is listed by Bergey (*1*). Pure culture sludges of about 2,000 p. p. m. suspended solids, developed by this culture in sterile synthetic sewage, will oxidize during a 3-hour aeration period an average of 73.3 percent of the 5-day biochemical oxygen demand of the substrate. Under similar conditions, with sludges of about 792 p. p. m., but using sterilized domestic sewage, an average of 79.3 percent of the oxidizable material was oxidized. This culture differs from culture 88, *Zooglea ramigera*, isolated by Soriano (*14*), in respect to flagella, appearance of growth on agar slant, and liquefaction of gelatin.

Culture 53 was isolated from a sample of sludge received from the South unit of the activated sludge plant at Lancaster, Pa. When the sludge was examined microscopically many fuzzy tree-like protuberances were found, indicating that the sludge at the time of examination was in a poor condition and would settle slowly. Pure culture sludges with suspended solids of about 1,048 p. p. m., during a 5-hour aeration period, oxidized 70 percent of the 5-day biochemical oxygen demand of the substrate, using sterile synthetic sewage and 89.5 percent in sterilized domestic sewage by sludges with 1,351 p. p. m. suspended solids. This culture was reported by Butterfield et al. (*4*) as culture Z–4. Ruchhoft et al. (*11*) have reported that there is a remarkable similarity between the purification accomplished by a

TABLE 1.—*Characteristics of zooglea-forming organisms isolated*

Log No.	Source	Form	Diameter	Gram stain	Capsule	Chains	Photic	H_2S	Voges-Proskauer	Methyl red	Citrate	Indol	Flagella	Spores	NO_3 to NO_2	Gelatin liquefaction	Relation to O_2 [1]	Agar growth [2]	Agar slant [3]
50	Activated sludge	Rod	1.0	−	+	−	−	−	−	−	±	−	Polar	−	−	−	1	1	D
53	do	do	1.0	−	+	−	−	−	−	−	−	−	do	+	+	+	1	2	G
55	do	do	1.0	−	+	−	−	−	−	−	−	−	Peri	+	+	+	1	2	G
58	do	do	>1.0	−	+	−	−	−	−	−	−	−	do	−	+	−	2	2	G
60	do	do	>1.0	−	+	−	−	−	−	−	−	−	Polar	−	−	−	2	2	G
62	do	do	>1.0	−	+	−	−	−	−	−	−	−	Peri	+	+	+	1	3	G
82	do	do	1.0	−	+	−	−	−	−	−	Tr	−	Polar	+	+	+	1	2	G
83	do	do	1.0	−	+	−	−	−	−	−	+	−	do	−	+	−	2	2	G
85	do	do	1.0	−	+	−	−	−	−	−	−	−	Peri	−	+	+	1	2	G
86	do	do	1.0	−	+	−	−	−	−	−	−	−	Polar	+	−	+	1	2	G
88	do	do	1.0	−	+	−	−	−	−	−	−	−	Peri	+	+	+	1	1	G
104	do	do	>1.0	−	+	−	−	−	−	−	−	−	do	−	+	−	1	2	G
105	do	do	1.0	−	+	−	−	−	−	−	−	−	----	−	+	+	2	2	G
113	do	do	1.0	−	+	−	−	−	−	−	−	−	Peri	+	−	+	1	2	G
87	Trickling filter	do	1.0	−	+	−	−	−	−	−	−	−	----	−	−	+	2	2	G
100	do	do	1.0	−	+	−	−	−	−	−	−	−	Polar	−	+	−	2	3	G
102	do	do	1.0	−	+	−	−	−	−	+	+	+	do	−	+	+	2	3	G
103	do	do	1.0	−	+	−	−	−	−	+	+	+	do	−	+	+	2	3	G

Log No.	Chromogenesis	Peptonization	Carbohydrates 0.5 percent [4]												
			Arabinose	Xylose	Glucose	Galactose	Mannose	Sucrose	Lactose	Cellobiose	Raffinose	Melizitose	Dextrin	Mannitol	Salicin
50	−	−	----	A±	A±	----	----	----	A±	----	----	----	----	A±	----
53	−	+	A+	A±	A+	A±	A±	A±	0	A+	0	0	A±	A±	A±
55	−	−	A+	A+	A+	A±	A±	A±	0	A+	0	0	A±	A±	A±
58	−	−	----	0	0	----	----	----	0	----	----	----	----	0	----
60	−	−	A+	0	0	A±	A±	A±	A±	A+	0	0	A±	0	A±
62	−	+	----	0	A+	----	----	----	0	----	----	----	----	A±	----
82	−	+	A+	A±	A+	A±	A+	A±	0	A+	0	0	A±	A±	A±
83	B	−	A+	A±	A±	A±	A±	0	0	A+	0	0	A±	0	0
85	−	−	A±	0	A+	A±	A±	0	0	A±	0	0	0	A+	A±
86	O	−	A+	A±	0	A±	0	0	0	A±	0	A±	0	0	0
88	−	−	A+	0	A±	0	A±	0	0	A+	0	A+	A±	A+	A±
104	−	−	----	0	A±	----	----	----	0	----	----	----	----	A±	----
105	−	−	----	0	0	----	----	----	0	----	----	----	----	0	----
113	−	+	A+	A±	A+	A±	A±	A±	A+	A+	0	0	A±	A±	A±
87	Y	−	A±	0	0	A±	A±	0	0	A+	0	A±	A±	0	0
100	−	−	A+	0	0	A+	A±	0	0	A±	0	0	0	0	0
102	−	−	A+	A+	A+	A±	A+	A+	A±	A±	0	0	0	A+	A±
103	−	−	----	----	A+	A+	----	----	----	----	----	----	----	A+	----

[1] Relation to O_2: 1=strict aerobe. 2=facultative anaerobe.
[2] Agar growth: 1=scanty. 2=moderate. 3=abundant.
[3] Agar slant: D=dull. G=glistening.
[4] Carbohydrates: A±=pH 6.9 to 6.5. A+=pH below 6.5. 0=no change in pH.
Chromogenesis: −=no color. B=Brown. O=orange. Y=Yellow.

pure culture sludge developed by one species of zoogleal bacteria, such as culture 53, and a normal activated sludge. The effect of dispersion of the bacterial flocs in a pure culture sludge developed by this culture has been reported by Butterfield and the author (*5*).

Culture 55 was isolated from a sample of activated sludge received from the North plant at Lancaster, Pa., during the winter months. A pure culture sludge developed by this bacterium removed 69.1 percent of the oxidizable material from sterile synthetic sewage and 84.7 percent from sterilized domestic sewage during a 5-hour aeration period. The North plant sludge appeared to be in better condition than the sludge from the South plant at the various times examinations were made.

Zooglea culture 58 was isolated from the sludge which was the source of culture 55. This culture was originally culture Z–9, reported by Butterfield et al. (*4*). With pure culture sludges of about 1,905 p. p. m. suspended solids developed by this culture, 78.2 percent of the 5-day biochemical oxygen demand was oxidized during a 5-hour aeration period, using sterile synthetic sewage as a medium, while 88 percent of the 5-day biochemical oxygen demand was oxidized from sterilized domestic sewage, using sludges of about 2,138 p. p. m. suspended solids.

The above zooglea-forming cultures had been isolated from samples of sludge taken during the winter months.

Culture 60 was isolated from sludge collected from the Calumet Sewage Treatment Plant during the summer months. This culture when inoculated into sterile synthetic and sterilized domestic sewage developed-sludge like masses, but the degree of purification has not been determined. As it required several weeks to develop a pure culture sludge suitable for use in purification studies in sterile synthetic sewage and sterilized sewage, such rates have not been determined for cultures 60, 62, 82, 88, 100, 104, 105, 113, and 85.

Culture 62 was isolated from the experimental sludge plant at this laboratory after the sludge had been treated with toluene, in an attempt to get rid of fungus and other filamentous forms. The percentage of purification accomplished by this culture was not determined.

Culture 82 was isolated from a *Sphaerotilus* culture which had been growing in a medium containing 1,000 p. p. m. of dextrose. No experimental work has been done using a pure culture sludge developed by this organism.

Culture 83 was isolated from sludge developed at this laboratory by aerating settled domestic sewage at room temperature, in an 8-liter serum bottle, fed daily, by the fill-and-draw method, with settled domestic sewage. This culture was the only zooglea-forming

bacterium which produced a brownish color when grown on sterile potato. Pure culture sludge was developed by this culture in a sterile synthetic sewage by the fill-and-draw method. This sludge thus developed was used and reported by Ruchhoft (*12*) in the studies of glucose removal from substrates by activated sludge.

Culture 85 was isolated from the experimental activated sludge plant at this laboratory. This culture developed typical zoogleal flocs in sterile synthetic sewage under aeration, but no purification rates were determined.

Culture 86 was isolated from sludge developed at 20° C. after inoculating 8 liters of sterile synthetic sewage with 5 ml. of domestic sewage. Pure culture sludge of about 1,000 p. p. m. developed under aeration by this culture in sterile synethetic sewage oxidized an average of 64.0 percent of the 5-day biochemical oxygen demand in 5 hours. The percent purification accomplished by the organism in sterile domestic sewage has not been determined. The culture was the only zooglea-forming bacterium isolated from sludge that produced an orange color when grown on potato or in synthetic media. This culture was used by Butterfield and the writer (*19*) in a comparative study of the growth and purification of a zooglea-forming bacterium isolated from activated sludge when grown and operated as a trickling filter and as an activated sludge.

Culture 88 was not isolated at this laboratory. It was isolated from activated sludge and classified as *Zooglea ramigera* by Soriano (*14*). Sludge-like flocs developed in sterile synthetic sewage and sterilized settled sewage under aeration. No purification rates have been determined. This culture is similar to culture 85 in cultural characteristics.

Cultures 104 and 105 were isolated from flocs picked from a sludge developed by aerating domestic sewage at room temperature. The sludge was fed daily with 1,000 p. p. m. dextrose for a period of 10 to 12 weeks before these isolations were made. Microscopic examinations showed the sludge had the appearance of a good activated sludge at the time the isolations were made. The oxidation rates of these cultures have not been determined.

Culture 113 was picked from flocs formed in aerated domestic sewage kept at room temperature and fed daily with raw sewage. No purification studies have been completed with pure culture sludge developed by this organism in sterile synthetic sewage or sterilized domestic sewage.

CULTURES ISOLATED FROM TRICKLING FILTERS

All of the zooglea-forming organisms from trickling filters that have been studied have been isolated from the experimental trickling filter at the Stream Pollution Station, Cincinnati, Ohio. Other isolations

have been made from full-scale filter units at Osgood, Ind., and at Dayton, Ohio. These cultures all produced, under aeration, sludge-like flocs when inoculated into sterile synthetic sewage or sterilized domestic sewage.

Culture 87 is the only zoogleal culture isolated that has a distinct yellow color. It was isolated from the film covering the stones taken from the top section of the experimental trickling filter during the early spring. The percent of over-all purification accomplished by pure culture sludges of about 1,180 p. p. m. suspended solids developed by culture 87 in sterile synthetic sewage has been found to be 73.6 percent during a 5-hour aeration period. The percentage purification, when the sludge was developed and fed sterilized sewage, has not been determined.

Culture 100 was isolated from the top section of stones. The film was washed from the stone and a typical finger-like floc was picked, washed, and transferred to lactose broth. After flocs had developed, purification was done using the same technique as previously explained. Sludge-like flocs developed under aeration in sterile synthetic sewage or sterilized domestic sewage. No purification studies have been completed with this culture.

Culture 102 was isolated in a manner similar to culture 100. The floc was picked from film adhering to the stones of the top layer. No purification studies have been carried out using sludge developed by this organism.

Culture 103 was isolated from the film removed from the top layer of stones following the procedure used in the isolation of culture 87. The over-all purification during the 5-hour aeration period was found to be 82.2 percent of the 5-day biochemical oxygen demand of the sterile synthetic sewage. The purification properties of this organism have not been determined when developed on and fed sterilized domestic sewage.

Cultures 100, 102, and 103 were isolated from the trickling filter during the summer months. Sludges developed under aeration by inoculating sterile media, either synthetic or domestic sewage, are very similar to a sludge developed by a zooglea-forming organism isolated from the filter during colder months. The pure culture sludges developed by all of the trickling filter zoogleal organisms isolated resemble very closely in appearance pure culture sludges developed, under similar conditions and in similar media, by zooglea-forming organisms isolated from activated sludge. The rate of purification in the sterile synthetic sewage and sterilized domestic sewage is practically the same.

The effects of carbohydrates were determined by two methods. Dilute agar was prepared by dissolving in 1 liter of distilled water 5.0 gm. peptone, 7.25 gm. Na_2HPO_4, 0.7 gm. KH_2PO_4, 1 gm. agar and

5.0 gm. of the carbohydrate being tested. The agar was sterilized by autoclaving at 15 pounds for 15 minutes except when the sugar under consideration would break down by this method; intermittent sterilization was then used. Broth containing the same percentage of the various carbohydrates with the addition of brom cresol blue was also used. All tubes were read after incubating 14 and 31 days at 20° C.

The change of the pH value in the various sugar broths seems to indicate slight use of sugar. No gas production was observed. The results presented by Ruchhoft, Kachmar, and Moore (*12*) show that a pure culture sludge of a concentration of about 1,395 p. p. m. developed by culture 83, in sterile synthetic sewage with an average of 840 p. p. m. glucose added, removed 90.5 percent of the glucose in 23 hours. A pure culture sludge, developed in a similar manner by culture 86, with initial suspended solids of 686 p. p. m. in sterile synthetic sewage containing 505 p. p. m. glucose, utilized 84.7 percent in 24 hours. The pure culture sludges in the above experiments were kept under sufficient aeration to maintain aerobic conditions and the amount of sludge used was much greater; whereas in our tests using the pH range as an index of the utilization of sugar, very small amounts of inoculum were used and the tubes remained quiescent. In the experiments by Ruchhoft et al. (*12*) the glucose was utilized in the production of growth, and appears as bacterial protoplasm without the accumulation of intermediate acid end products. The hydrogen-ion concentration of the substrate as shown by Ruchhoft et al. (*12*) influences the rate of glucose removal as well as growth and floc formation which will be discussed later in this paper.

The presence of spores was determined by two methods: (1) the heat test—tubes being held after heating 20 minutes at 80° C. for 14 days at 20° C., and (2) staining with the Schaeffer and Fulton (*13*) modification technique. Liefson's (*10*) flagella stain was used. The semisolid KNO_3 medium of Zobell and Meyer (*18*) was used to determine nitrate reduction. If, during incubation, gas was produced with or without the reduction of nitrate, bubbles would be held in the media. No gas was produced in any instance.

From the cultural characteristics it is noted that all zoogleal cultures isolated are identical in nine characteristics: form, Gram stain, capsule, nonchain forming, photic, hydrogen sulfide, Voges-Proskauer, and the reaction with arabinose and raffinose. This would indicate that the zooglea-forming organisms isolated from activated sludge and trickling filters were closely related. Considering in addition the results of the following determinations—spores, production of indol, gelatin liquefaction, methyl red, citrate, and the reaction with cellobiose, dextrin, and salicin—the zoogleal cultures studied may be divided into nine groups as follows:

1. Cultures 53, 55, 62, 82, 88, and 113 isolated from activated sludge.
2. Cultures 58, 60, and 104 isolated from activated sludge.
3. Cultures 102 and 103 isolated from trickling filters.
4. Cultures 87 and 105 isolated from activated sludge and trickling filters.
5. Culture 100 isolated from trickling filter.
6. Culture 50 isolated from activated sludge.
7. Culture 83 isolated from activated sludge.
8. Culture 85 isolated from activated sludge.
9. Culture 86 isolated from activated sludge.

By adding the appearance of growth on agar slant, the relation to oxygen and the ability to reduce nitrates, groups 2 and 4 would be subdivided.

The close but not all-inclusive similarity brought out by the cultural characteristics is further evidence for the above-mentioned close relationship, implying that we are dealing with several varieties of a single group.

In the first four groups, each including more than one culture, similar reactions were obtained in very few of the additional cultural characteristics studied. The organisms within group 1 reacted similarly in regard to chromogenesis and their relation to oxygen. However, varying results were obtained from flagella stain, reduction of nitrates, peptonization of milk, and their ability to utilize xylose, glucose, galactose, mannose, lactose, melizitose, and mannitol.

Within group 2 similar results were obtained from growth in milk, chromogenesis, and the organisms' ability to utilize xylose. Differing results were obtained from flagella stain, their relation to oxygen, the formation of nitrites from nitrates, and their ability to utilize glucose, galactose, mannose, sucrose, lactose, melizitose, and mannitol. Both organisms listed in group 3 gave similar results with all of the tests used. The organisms listed in group 4 reacted in the same manner in regard to their utilization of xylose, lactose, growth in milk, their relation to oxygen, and flagella stain. Dissimilar results were obtained by the organisms in group 4 in the following: reduction of nitrates to nitrites, chromogenesis, and their utilization of glucose, mannose, sucrose, melizitose, and mannitol.

The results of the reactions used for group classification are presented in table 2, and it is shown clearly that the organisms being discussed are closely related. From the results listed, groups 1 and 9 differ only in utilization of carbohydrates. The same difference is observed for groups 4 and 8. Groups 6, 2, 7, and 5 differ in utilization of carbohydrates and growth in sodium citrate broth. Greater differences are observed in the results of the reactions of group 3 and the results of the other groups.

TABLE 2.—*Results of the reactions used for group classification*

Group	Spores	Indol	Gelatin liquefaction	Methyl red	Citrate	Carbohydrates 0.5 percent		
						Cellobiose	Dextrin	Salicin
3	−	+	+	+	+	A±	0	A±
1	+	−	+	−	−	A+		
9	+	−	+	−	−	A±	0	0
4	−	−	+	−	−	A+	A±	0
8	−	−	+	−	−	A±	0	A±
6	−	−	−	−	±			
2	−	−	−	−	−	A+	A±	A±
7	−	−	−	−	−	A+	A±	0
5	−	−	−	−	−	A±	0	0

EXPERIMENTAL WORK

The primary characteristics of these zoogleal bacteria were that they must grow in pure culture in flocs or colony formation in liquid media under aeration sufficient to maintain aerobic conditions. Experiments were instituted to determine (1) the minimum food requirement, (2) the effect of hydrogen-ion concentration on growth and floc formation, and (3) the effect of various substances commonly found in sewage in regard to growth and sludge production.

MINIMUM FOOD REQUIREMENT

Culture 86 was used in the tests to determine the minimum food requirement for floc production. Sterile synthetic sewage, of varying concentration, was inoculated with culture 86, incubated at 20° C. under aeration. The results given in table 3 indicate that synthetic sewage of less than 10 percent concentration would not support growth. A concentration of 17.5 percent to 37.5 percent produced growth but no floc formation. In a 50-percent concentration both growth and floc formation were observed after 4 days, but floc formation occurred sooner in full strength media.

TABLE 3.—*Growth of pure culture zooglea in synthetic media of varying food concentration*

Culture	Percent food concentration [1]	Peptone p. p. m.	Results
86	1	3	No growth, aerated 7 days.
86	10	30	No growth, aerated 7 days.
86	17.5	52.5	Turbid, no floc, aerated 10 days.
86	25	75	Turbid, no floc, aerated 4 days.
86	37.5	112.5	Turbid, no floc, aerated 10 days.
86	50	150	Turbid and floc in bottom, aerated 4 days.
86	100	300	Turbid and floc throughout, aerated 2 days.

[1] Percent of standard synthetic sewage added.

pH EFFECTS

Observations on the influence of hydrogen-ion concentration on growth were made as follows: Flasks containing 100 ml. of synthetic sewage were sterilized and the pH was adjusted using sterile 10 percent H_3PO_4 or sterilized 10 percent NaOH to cover the range from pH 3.5 to pH 10.0. After such adjustment the flasks were inoculated with a suspension of culture 86, previously shaken with sterile glass beads, and examinations to determine the initial total count per ml. and the pH were made. The flasks were incubated at 20° C. for 24 hours and the pH value and total counts were again determined. From the results presented in table 4 it will be observed that there was a tendency for the lower pH to rise during the incubation period and for the pH values in the higher range to drop.

TABLE 4.—*Pure culture 86 in standard synthetic sewage of varying pH readings. Flasks and plates incubated at 20° C.*

pH readings		Series 1, bacteria per ml.		Series 2, bacteria per ml.		Series 3, bacteria per ml.	
0 hour	24 hour	0 hour	24 hour	0 hour	24 hour	0 hour	24 hour
3.5	3.8		No growth [1]				
4.0	4.6		do [1]				
4.5	4.7		do [1]				
5.0	5.5	97	Less than 1	156	Less than 10,000		
5.5	5.9	97	do	156	do	13	Less than 10.
6.0	6.4	97	195	156	400,000	13	100.
6.5	6.8	97	21,500	156	650,000	13	200.
7.0	7.1	97	3,020,000	156	1,560,000	13	56,900.
7.5	7.2	97	267,000,000	156	370,000	13	82,500.
8.0	7.4	97	68,000,000	156	35,000	13	120,000.
8.5	7.6	97	69,000,000	156	890,000	13	186,000.
9.0	8.7					13	57,800.
9.5	8.6		No growth [1]				
10.0	9.8		do [1]				

[1] Observations based on turbidity readings.

The number of organisms per ml. increased most rapidly at a pH of 7.0 to 8.0. Incubating the flasks for an additional 24 hours, for a total of 48 hours at 20° C, produced very little change in the flasks of the upper range. Microscopic examination of the flasks at the end of the 24-hour period showed few flocs present in the flasks of pH 6.5 and no flocs at lower pH values. Floc formation increased up to a hydrogen-ion concentration of pH 7.5 and decreased with further increase in pH. In the development of pure culture sludges, this principle has been followed by adjusting the pH value after feeding to pH 6.5. During a 24-hour aeration period the hydrogen-ion concentration increases to pH 7.6. Therefore, judging by the bacterial counts obtained and from the microscopic appearance of the growth, the optimum pH for growth and floc formation appears to be pH 6.8 to 7.5.

EFFECT OF VARIOUS SUBSTANCES COMMONLY FOUND IN SEWAGE

Various substances commonly found in sewage, such as soap, sodium ricinoleate, sodium formate, sodium oleate, creatine, pectin, glucose, glycerine, and sucrose, were added to synthetic sewage in an effort to stimulate growth and floc formation. Glucose was the only substance used which when added increased floc formation materially, as is also shown by the studies of Ruchhoft et al. (*12*). No increase was observed when glucose was added to synthetic sewage if beef extract or urea was omitted. Cultures 53, 60, 83, 87, 104, and 113 were used for these experiments.

TABLE 5.—*Effect of various substances on growth of pure culture zooglea organisms*

Basic medium	Substance added	Amount per liter added	Culture	Results
Synthetic sewage	Soap [1]	0.1 gm	53	Floc developed; few free organisms.
Do	Na. ricinoleate	0.1 gm	53	No floc developed; few free organisms.
Do	do	0.05 gm	53	Little floc developed; supernatant turbid pink color.
Do	do	0.025 gm	53	Floc developed.
Do	do	0.05 gm	53	Small amount floc developed; pink color.
Do	do	1.5 gm	53	Do.
Do	Na. formate	0.5 gm	53	Normal amount floc developed.
Do	No. oleate	0.05 gm	53	Do.
Do	Creatine	0.05 gm	53	Very little floc developed.
Do	Certo	5 ml	113	Floc developed.
Do	do	2 ml	53	Supernatant turbid; small amount floc.
Do	do	1 ml	113	Growth, but no floc.
Do	Pectin [2]	2 ml	53	Floc developed; no increase in amount.
Do	do [2]	1 ml	53	Small flocs; no increase in amount.
Do	do [2]	0.5 ml	53	Small loose flocs.
Do.[3]	Glucose	0.1 gm	53	Supernatant turbid; no flocs.
Do.[3]	do	0.1 gm	53	Do.
Do.[3]	do	0.1 gm	113	Flocs; no increase in amount sludge.
Do.[4]	Glycerine	0.05 gm	53	Sludge developed.
Do.[4]	do	0.05 gm	113	Do.
Do.[4]	do	0.05 gm	53	Do.
Do.[4]	do	0.05 gm	113	Do.
Do.[4]	Sucrose	0.05 gm	53	No flocs; supernatant turbid.
Do.[4]	Glycerine	0.05 gm	53	Floc developed slowly.
Do [4]	Glucose	10.0 gm	53	No growth.
Do	Glycerine	0.5 gm	53	Sludge developed.
Do	do	0.5 gm	60	Sludge developed; no increase in amount.
Do.[4]	Glucose	0.05 gm	53	No increase in amount; floc developed.
Do.[4]	Glycerine	0.05 gm	53	Do.
Do.[4]	do	0.05 gm	83	Do.
Do	Glucose	0.5 gm	87	Amount of floc increased.
Do	do	0.5 gm	104	Slight increase in floc.
Do	do	0.5 gm	104	Do.
Do	do	0.5 gm	83	Amount of floc increased.

[1] Bell's Castile hand soap.
[2] Pectin extracted from grapefruit rind.
[3] Beef extract omitted from synthetic.
[4] Urea omitted from synthetic.

SUMMARY

The predominant bacteria of activated sludge and of trickling filters have been isolated in pure culture. It would appear that these zoogleal bacteria might be considered in one group. All cultures studied, isolated from activated sludge and trickling filters, were short Gram-negative rods, failed to produce H_2S or acetyl methyl carbinol, produced acid in broth containing arabinose, produced no change in

broth containing raffinose, and produced capsules which bound the cells together in a capsular matrix tenaciously enough to remain intact under agitation sufficiently violent to keep the flocs suspended and to maintain aerobic conditions. Such sludge flocs of about 1,500 p. p. m. suspended solids composed entirely of masses of bacterial cells in pure culture will remove in 3 hours 36.3 to 84.2 percent, and in 5 hours 55.6 to 91.6 percent of the 5-day biochemical oxygen demands of polluted water or sewage.

The cultures isolated may be divided into nine related groups determined by the following characteristics: formation of spores, indol reaction, gelatin liquefaction, methyl red test, growth in citrate media, motility, and the pH reading in broth containing cellobiose, dextrin, and salicin.

The floc-forming organisms isolated from trickling filters will develop, under aeration, an activated sludge and will function similarly to a sludge developed by the floc-forming organisms isolated from activated sludge. This indicates that the zoogleal organisms found in trickling filters and in activated sludge flocs are closely related.

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THE CHEMOTHERAPEUTIC ACTION OF A N-PHOSPHORYL DERIVATIVE OF 4-4′-DIAMINODIPHENYLSULFONE [1]

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It has been shown (*1*) that of a series of sulfonamides, sulfones, and certain phosphorus analogues 4–4′–diaminodiphenylsulfone proved the most effective bacteriostatic agent against the tubercle bacillus and the most effective in retarding the progress of experimental tuberculous infection in guinea pigs. The excessive toxicity of this compound made it desirable to develop derivatives of lower toxicity without sacrificing specificity. The present report concerns the pharmacologic and chemotherapeutic properties of a N–phosphoryl derivative of 4–4′–diaminodiphenylsulfone.

Other attempts have been made to reduce the toxicity of 4–4′–diaminodiphenylsulfone by substitutions following Buttle's (*2*) demonstration of its high antibacterial action. The acetylated derivatives introduced by Fourneau (*3*) proved of little superiority over the parent substance. The formaldehyde sulfoxylate and bisulfite derivatives of Bauer and Rosenthal (*4*), though much less toxic than 4–4′–diaminodiphenylsulfone, were also less active. The substituted derivative 4–amino–4′–hydroxy–diphenylsulfone and others prepared by Raiziss (*5*) similarly had less antistreptococcic action than 4–4′–diaminodiphenylsulfone and but little antipneumococcic action. The sulfonated glucose derivative (promin) likewise has but little advantage over sulfanilamide in streptococcus infection and sulfapyridine in pneumococcus infection (*6,7*). Roblin and associates (*8*) reported an active

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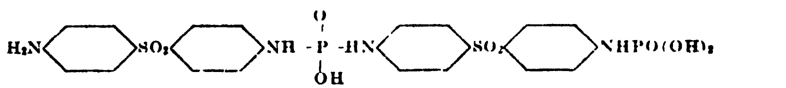
sulfanyl derivative, but gave no details. Dewing and associates (*9*) prepared a series of derivatives, but these were for the most part inactive. A nicotinic acid derivative[2] currently prepared in this laboratory by Hugo Bauer has little antistreptococcic or antipneumococcic activity. Its action against the tubercle bacillus is under investigation.

The phosphoryl derivative of 4–4′–diaminodiphenylsulfone which forms the subject of the present report has been prepared and is being studied in connection with investigations on the chemotherapy of tuberculosis to be reported later. Observations with this compound in other experimental bacterial infections, however, appear sufficiently interesting to warrant the publication of a preliminary note at this time.

CHEMICAL AND PHYSICAL PROPERTIES

The N–phosphoryl derivative was obtained by the reaction of phosphorus oxychloride with 4–4′–diaminodiphenylsulfone and subsequent hydrolysis of the resulting chlorophosphoryl derivative. The results of analyses of the substance for carbon, hydrogen, nitrogen, phosphorus, and sulfur correspond to the empirical formula $C_{24}H_{24}O_9N_4P_2S_2$. The compound probably has the following structure:



It is an amorphous powder, which is only slightly soluble in water and the usual organic solvents at room temperature. Its sodium salt is freely soluble in water. Aqueous solutions having a pH of 6 to 7 may be prepared by treating the substance with N/1 NaOH solution in the proportion of 1.8 to 2.2 cc. per gm. of compound. In agreement with the above formula the diazotization value of the compound by the Bratton and Marshall (*10*) procedure is slightly over 20 percent of that found for 4–4′–diaminodiphenylsulfone. An article on the synthesis of this N–phosphoryl derivative will be published elsewhere by one of us. (E. L. J.)

The usual procedure for the estimation of the sulfonamide drugs in the body fluids is applicable to the determination of the N–phosphoryl derivative in the urine, but does not yield quantitative results in blood. When added to urine and measured by the Bratton and Marshall technique, the compound is recoverable 100 percent; after hydrolysis, it is recoverable to the extent of 250 percent. The latter figure is

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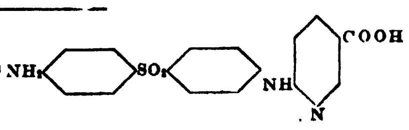
[2] 

consistent with results obtained by hydrolysis of the compound for 1 hour at 100° C. with N/10 to N/1 HCl; the diazotization value is increased by this hydrolysis reaction to a maximum of about 50 percent of the value shown by 4–4′–diaminodiphenylsulfone. When added to blood or tissues, the substance is recoverable only to the extent of about 40 to 60 percent whether determined as "free," or as "total" after hydrolysis. Added to plasma it is nearly completely recoverable, but when added to erythrocytes, 30 to 40 percent is recoverable. The reason for this is not clear, though this obviously complicates the problem of the fate of the substance in the body.

TOXICITY

Given to mice the compound is tolerated in doses of 0.5 gm. per kg. whether given orally or subcutaneously. A dose of 1.0 gm. per kg. gave 80 percent mortality in mice when injected subcutaneously and 60 percent mortality when given orally. Rats receiving 0.5 gm. per kg. injected intravenously uniformly survived. Guinea pigs tolerate 1.5 gm. per kg. when given orally and 0.5 gm. per kg. when given subcutaneously. Four out of 10 animals survived a single dose of 0.75 gm. per kg. injected subcutaneously.[3] These data are shown in table 1. Since the same mortality rate was obtained from a single oral or subcutaneous injection of 0.3 gm. per kg. 4–4′–diaminodiphenylsulfone (the latter as 7.5 percent solution in propylene glycol), it would appear that this compound is at least half and possibly one-fifth as toxic as 4–4′–diaminodiphenylsulfone. Guinea pigs and mice survived repeated daily subcutaneous injections of from 0.2 to 0.3 gm. per kg. for a period of from 2 to 4 weeks, and the daily oral administration of 0.5 gm. per kg. in guinea pigs over a period of 3 weeks had little effect on the growth curve.

TABLE 1.—*Acute toxicity*

Animal species	Dose (Gm. per kg.)	Route	Number	Survival (Percent)
Mice	0.5	Oral		90
	1.0	do		40
	0.5	Subcutaneous		80
	1.0	do		20
Rats	0.5	Intravenous		100
	0.75	do		0
Guinea pigs	0.5	Subcutaneous		80
	0.75	do		40
	1.0	do		0
	1.5	Oral		100

ABSORPTION AND EXCRETION

These were studied in guinea pigs and rabbits. As stated previously, the failure to recover the drug quantitatively when added to blood makes blood level determinations a procedure of uncertain value.

[3] Large doses injected subcutaneously often produce local irritant action.

However, it was deemed necessary to do some of this work even if the information so obtained has only a partial value. The absorption of the drug in the guinea pig appears to be equally as satisfactory whether given orally or subcutaneously. The relative blood levels are shown in table 2, and the percent excretion is shown in table 3. In rabbits similar observations were made with the drug administered orally, subcutaneously, or intravenously in doses of from 50 to 500 mg. per kg. with the results as shown in table 4.

TABLE 2.—*Blood levels in guinea pigs after 0.2 gm. per kg.*

Time (hours)	Mgs. percent	
	Oral	Subcutaneous
½		6.5
1	8.0	
2		5.5
2½	5.0	
22	0.2	0.2

TABLE 3.—*Urinary excretion in guinea pigs, percent of dose administered*

No	Subcutaneous injection 0.5 gm. per kg					Oral administration 1.5 gm. per kg.					
	First day	Second day	Third day	Fourth day	Total	First day	Second day	Third day	Fourth day	Fifth and sixth days	Total
1	49	9	2	1	61	13	14	11	7	6	31
2	30	12	5	2	49	18	14	11	5	7	55
3	35	16	9	1	61	18	8	9	3	2	40
4	27	15	8	3	53	14	11	12	5	3	45

TABLE 4.—*Blood levels and urinary excretion in rabbits*

No	Dose (mg per kg.)	Route	Blood level (mg. percent)		Urinary excretion (percent of dose)	
			Peak within 6 hours	At 24 hours	At 24 hours	At 48 hours
1	50	Intravenous	4.2	0	60	------
2	200	do	12.0	0.2	65	73
3	200	Subcutaneous	5.1	1.0	57	63
4	200	Oral	2.9	1.6	62	71
5	500	do	4.4	0.6	43	47
6	500	do	6.8	1.2	55	63

BACTERIOSTATIC TESTS

The bacteriostatic action of the phosphoryl derivative was compared with diaminodiphenylsulfone and sulfadiazine. Because addition of this compound to media containing peptone caused precipitation, tests were run in peptone-free beef infusion broth containing 0.2-percent glucose (pH 7.0). It has been previously found that in such a medium relatively high bacteriostatic values are obtained with the sulfonamide

drugs. Approximately 10,000 organisms per 10 cc. from an 18-hour culture in rabbit-blood broth were employed. The following values represent the highest dilutions which inhibited growth for 24 hours:

	Pneumococcus I	*Streptococcus No. 1685*[1]
Phosphoryl derivative	50,000	25,000
Diaminodiphenylsulfone	200,000	100,000
Sulfadiazine	50,000	25,000

[1] Hemolytic, Group A.

In vitro diaminodiphenylsulfone was the most active of the three compounds.

THERAPEUTIC TESTS

These were carried out with the same strains of organisms employed in the bacteriostatic experiments. They have been employed in this laboratory for several years and maintained at a virulence such that 0.5 cc. of an 18-hour broth culture intraperitoneally is lethal to mice in dilutions up to 10^{-9}.

Upon hemolytic streptococcal infections in mice, it is seen (table 5) that the phosphorylated sulfone was of the same order of activity as the parent sulfone when both are given subcutaneously. On oral administration the sulfone increases in activity while the phosphorus compound gave evidence of being less active. Sulfadiazine orally was approximately one-sixteenth as active as the diaminosulfone, and less than one-eighth as active as the phosphoryl derivative.

TABLE 5.—*Comparative effects upon hemolytic streptococcus infections in mice*

Infective dose	Therapy	Route	Number of mice	Death in days 1	2	3	4	5	6	7	8–14	Mortality (percent)
0.5 cc., intraperitoneal injection, 10^{-6} dilution.	Diaminodiphenylsulfone:											
	0.125 mg. B D × 4 days	Oral	30		1			1	4	2	3	36.6
	0.25 mg. B D × 4 days	do	20		1				1	1		15
	0.125 mg. B D × 4 days	Subcutaneous.	16	1	6	1			1		1	62.5
	Phosphoryl derivative:											
	0.125 mg. B D × 4 days	do	35	1	5	1	2	5	4	1	2	60
	0.25 mg. B D × 4 days	do	40	2	3		1	2	1		5	35
	0.125 mg. B D × 4 days	Oral	15	2	7	1		3				86.6
	0.25 mg. B D × 4 days	do	19				2	1	2			26.3
	Sulfadiazine:											
	2.0 mg. B D × 4 days	do	15		1			1	2	1	1	40
	Controls		49	45	3							98

Upon type I pneumococcus infections diaminodiphenylsulfone orally in the maximum tolerated dose (2 mg. daily) caused prolongation of life, but only 2 of 52 mice survived the infection (table 6). The phosphoryl derivative subcutaneously gave more favorable results, and with 3 to 5 mg. daily for 4 days approximately half of the animals survived. Sodium sulfadiazine subcutaneously in equivalent doses was

less active while sulfadiazine orally was approximately one-tenth as active as the phosphoryl derivative.

TABLE 6.—*Comparative effects upon pneumococcus type I infections in mice*

Infective dose	Therapy	Route	Number of mice	Death in days 1	2	3	4	5	6	7	8–14	Mortality (percent)
0.5 cc., intraperitoneal injection, 10^{-6} dilution.	Diaminodiphenylsulfone:											
	1.0 mg. B D × 4 days	Oral	52	2	6	2	1	8	14	8	9	96.0
	Phosphoryl derivative:											
	1.0 mg. B D × 4 days	Subcutaneous.	45	2	8	6	4	2	3	6	8	86.6
	1.5 mg. B D × 4 days	do	15					1	3	2	2	53.3
	2.5 mg. B D × 4 days	do	42		3	1		6	8	6	5	57.0
	1.0 mg. B D × 4 days	Oral	15		8	2			1	3	1	100 0
	Sulfadiazine:											
	10.0 mg. B D × 4 days	do	15			2	5		2	1		66 6
	15.0 mg. B D × 4 days	do	15		1	1	1		1	2	4	66.6
	25.0 mg. B D × 4 days	do	13					1	1	1	3	46.0
	Sodium sulfadiazine:											
	1.0 mg. B D × 4 days	Subcutaneous.	13		2			3	3	2	2	92.3
	2.5 mg. B D × 4 days	do	30	3		1		2	7	5	3	70.0
	5.0 mg. B D × 4 days[1]	do	9							2	1	33.3
	Phosphoryl derivative:											
	0.1 percent in diet for 7 days.		20		8	8				2		90.0
	0.2 percent in diet for 7 days.		20		4	5	1	1	1	1	2	75 0
	Sulfadiazine;											
	0.1 percent in diet for 7 days.		19		6	5	1		1	3	2	94.7
	0.2 percent in diet for 7 days.		20		4	2	1			1	3	55 0
	Controls		75	63	12							100 0
0.5 cc., intraperitoneal injection, 10^{-8} dilution.	Phosphoryl derivative:											
	1.0 mg. B D × 5 days	Subcutaneous.	15		6		1	1	1	2	2	86 6
	2.5 mg. B D × 5 days	do	15	1	3			2	1	4	1	80 0
	Sodium sulfadiazine:											
	1.0 mg. B D × 5 days	do	15	3	5	1	3	1		2		100.0
	2.5 mg. B D × 5 days	do	15		1	1	2	1	1	3	1	66.6
	Controls		9	9								100.0

[1] Toxic dose. 6 additional mice died of drug toxicity.

The decreased activity of the phosphoryl derivative when administered orally was further shown in a comparison with sulfadiazine upon pneumococcal infection when the drugs were administered in the diets for 1 week after inoculation. The drug diets were begun 2 days prior to inoculation. Upon diets containing 0.1 percent of the drugs, survivors for 2 or more days were insufficient for quantitative comparison of drug intake. With 0.2 percent concentrations in the diet, the average daily food consumption was 3.1 gm. for the phosphorus compound and 2.8 gm. for sulfadiazine. Sulfadiazine with an average daily drug intake of 5.7 mg. resulted in mortality of 55 percent while the phosphorus compound with an average daily intake of 6.3 mg. gave a mortality of 75 percent.

No close correlation between *in vitro* and *in vivo* effects was observed. The bacteriostatic action of the phosphoryl derivative and sulfadiazine were of the same order, while the sulfone was approximately 4 times as active.

COMMENTS

Litchfield, White, and Marshall (*11*) using the drug-diet technique found that diaminodiphenylsulfone possesses an activity ratio against a pneumococcal infection nearly 7 times that of sulfapyridine and sulfathiazole and 16 times that of sulfanilamide. The average daily intake of the sulfone for a 50 percent survival in their experiments was 1.6 mg. The toxicity of the sulfone is high, and numerous attempts have been made to prepare active derivatives with lowered toxicity. Against pneumococcal infections none of these derivatives has shown particular promise.

The present experiments indicate that the phosphoryl derivative of 4–4′–diaminodiphenylsulfone appears different from the parent substance or its other known derivatives. Many of the sulfone derivatives studied heretofore, though less toxic than the parent substance are also less active, and what activity they possess appears to be due to the sulfone set free in the body. The phosphoryl derivative is considerably less toxic, and while its activity against streptococcus infection is somewhat less weight for weight than that of the sulfone, its activity against pneumococcus infection in relation to the tolerated dose is much better than that of the sulfone. Thus the phosphoryl derivative protected about 50 percent of mice against pneumococcus infection with a daily dosage of about one-half to one-third of the tolerated dose while the sulfone failed to protect under the same experimental conditions with maximum tolerated doses. Whether this is due to greater antibacterial specificity or to lower toxicity of the phosphoryl derivative as compared with the sulfone, it is not possible to state definitely at present. However, the increased activity towards pneumococcus as compared with streptococcus infections lends some support to specificity of action.

Accurate estimations of the phosphoryl derivative in the blood cannot be made at present; consequently, comparisons of antibacterial activity on the basis of blood concentrations cannot be made However, the following comparison of the phosphoryl derivative with the sulfone and sulfadiazine giving dosage levels which, when administered twice daily, will produce approximately the same degree of protection in mice may be helpful.

	Streptococcus	*Pneumococcus*
4–4′–Diaminodiphenylsulfone (oral)	0. 125 mg.	>1. 0 mg.
Phosphoryl derivative (s. c.)	0. 25 mg.	1. 5–2. 5 mg.
Sulfadiazine (oral)	2. 0 mg.	15. 0–25. 0 mg

Since the tolerated dose of the sulfone in mice is about 150 mg. per kg., while that of the phosphorylated sulfone is about 500 mg. per kg., it would appear that the phosphoryl derivative has a therapeutic index of 20 as compared with 13 for the sulfone against streptococcus

infection. The relative therapeutic index against pneumococcus infection is even more favorable. The therapeutic effectiveness of the phosphoryl derivative in experimental pneumococcus infection in mice also appears to surpass that of sulfadiazine.

The more important chemotherapeutic properties of the phosphoryl derivative of 4–4′–diaminodiphenylsulfone may be expressed numerically, in comparison with the parent sulfone, as follows (the corresponding value for the latter being in each case 1):

1. Diazotization value
   - a. Before hydrolysis 0.2
   - b. After hydrolysis 0 5
2. Acute toxicity
   - a. Oral 0.2
   - b. Subcutaneous 0 4
3. Antistreptococcic action
   - a. *In vitro* 0.25
   - b. *In vivo* 0 5
4. Antipneumococcic action
   - a. *In vitro* 0.25
   - b. *In vivo* .... greater than 1.0

Earlier investigations of phosphorylated derivatives of phenols (*12*) and alcohols (*13*) showed that such compounds often acquired new pharmacologic properties though the direction of change could not always be predicted. The present experiments with the phosphoryl derivative of 4–4′–diaminodiphenylsulfone appears to be another example illustrating the same principle

SUMMARY

The pharmacologic action and chemotherapeutic activity of a N–phosphoryl derivative of 4–4′–diaminodiphenylsulfone have been studied. Its toxicity is from one-half to one-fifth that of its parent substance. Its chemotherapeutic activity against streptococci is of about the same order as that of its parent substance.

When administered parenterally under the conditions of our experiments, this compound exhibited a curative action in experimental pneumococcus infections in mice that could not be demonstrated with the parent sulfone; the results obtained compare favorably with those from sulfadiazine and sodium sulfadiazine.

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PROVISIONAL MORTALITY RATES FOR THE FIRST HALF OF 1942

The mortality rates in this report are based upon preliminary data from 26 States, the District of Columbia, Alaska, and Hawaii for the first 6 months of 1942. Comparative data for the first 6 months of 1940 and 1941 are also presented for 24 States.

This report is made possible through a cooperative arrangement with the respective States which voluntarily furnish provisional monthly tabulations of current birth and death statistics to the United States Public Health Service which analyzes and publishes the data. Because of lack of uniformity in the method of classifying deaths according to cause, as well as some delay in filing certificates, these data are preliminary and may differ in some instances from the final figures subsequently published by the Bureau of the Census.

In the past, however, these preliminary reports have accurately reflected the trend in mortality rates for the country as a whole. Some deviation from the final figures, especially those for specific causes of death, for individual States may be expected because of the

provisional nature of the information. Nevertheless, it is believed that the trend in mortality within each State is correctly represented. Comparisons of specific causes of death for different States are subject to error because of variations in tabulation procedure and promptness of filing the original certificates. Such comparisons should be based upon the final figures published by the Bureau of the Census.

The mortality record of the first half of 1942 has been one of the most favorable in recent years. The death rate from all causes, 10.5 per 1,000 population, was about 5 percent less than the corresponding rate for 1941, and 8 percent less than the rate for 1940. All except five of the States for which information is available reported a decrease in the death rate.

The decrease in the mortality rate from all causes resulted from a decrease in the death rate from each of the important causes of death except cancer. For the latter cause, the death rate for the first half of 1942, 119 per 100,000 population, represented a slight increase over the rate for the first half of 1941, 118 per 100,000 population. The only other cause of death with a higher rate in 1942 than in 1941 was meningococcus meningitis, a relatively minor cause of death.

Each of the remaining important causes of death, tuberculosis, influenza, pneumonia, diabetes, cerebral hemorrhage, heart disease, nephritis, and accidents, was less prevalent during the first 6 months of 1942 than during the corresponding period of 1941. Most of the decline in the death rate from accidental causes resulted from a decrease in the rate from automobile accidents which was 14 percent less than the rate for 1941, although it was still slightly higher than the corresponding rate for 1940. All except three of the States for which data are available reported a decrease in the death rate from automobile accidents.

Both the infant and maternal mortality rates continued to decline; the former was about 10 percent and the latter nearly 20 percent less than the rate for 1941. The birth rate increased about 6 percent.

Provisional mortality from certain causes in the first 6 months of 1942, with comparative provisional data for the corresponding period in preceding years

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1–2)	Dysentery (27)	Diarrhea and enteritis under 2 years (119)	Scarlet fever (8)	Diphtheria (10)	Whooping cough (9)	Measles (35)	Cerebrospinal (meningococcus) meningitis (6)	Acute poliomyelitis and polioencephalitis (36)	Acute infectious encephalitis (lethargic) (37)
24 States[1]														
January–June:														
1942	10.5	18.7	44	2.6	0.4	0.6	4.3	0.4	0.5	2.1	1.3	0.8	0.2	0.4
1941	11.1	17.7	49	3.2	.6	(3)	4.4	.4	.6	3.0	2.9	.6	.3	.6
1940	11.4	16.8	50	4.2	.6	(3)	4.2	.7	.9	2.2	.5	.7	.2	.6
January–March:														
1942	11.0	18.5	49	2.8	.3	.4	3.6	.4	.8	2.2	1.4	.7	.2	.4
1941	11.9	17.4	53	3.0	.5	(3)	3.6	.4	.8	3.1	1.6	.7	.3	.5
1940	12.3	16.5	54	4.2	.5	(3)	3.5	.8	1.2	2.2	.5	.7	.3	.6
April–June:														
1942	10.0	19.0	41	2.5	.4	.9	5.0	.3	.2	2.0	1.1	.9	.2	.4
1941	10.4	17.9	45	3.4	.6	(3)	5.3	.4	.4	3.0	4.2	.5	.3	.6
1940	10.6	17.2	46	4.1	.7	(3)	5.0	.5	.5	2.2	.5	.6	.2	.7
Industrial policyholders:[3]														
1942	7.7	----	----	----	.3	----	[4] 3.3	.5	.5	1.0	.7	----	----	----
1941	8.0	----	----	----	.5	----	[4] 2.6	.6	.6	1.4	1.3	----	----	----
1940	8.1	----	----	----	.4	----	[4] 3.7	.7	.9	1.3	.4	----	----	----
Alaska:														
1942	17.5	25.9	121	1.0	(7)	(7)	7.9	(7)	2.6	15.9	5.3	5.3	(7)	(7)
1941	20.8	28.4	121	5.9	5.4	(3)	(7)	(7)	(7)	10.8	86.3	2.7	5.4	(7)
1940	20.2	26.1	156	2.1	(7)	(3)	5.5	(7)	8.2	43.8	246.2	[illegible]	(7)	(7)
Colorado:														
1942	11.2	19.3	52	2.2	.5	.5	1.4	1.1	1.2	4.1	2.6	.5	.4	.2
1941	10.9	18.4	52	3.1	.9	(3)	4.8	1.1	1.6	5.7	2.1	.7	.7	.7
1940	11.2	19.2	51	3.4	.7	(3)	2.1	.5	1.6	2.7	2.0	.5	1.1	.4

State and period	Death rate per 100,000 population (annual basis): Tuberculosis, all forms (13–22)	Syphilis (30)	Influenza (grippe) (33)	Pneumonia, all forms (107–109)	Cancer, all forms (45–55)	Diabetes mellitus (61)	Cerebral hemorrhage, embolism, and thrombosis (83 a, b)	Diseases of the heart (90–95)	Nephritis, all forms (130–132)	All accidents, including automobile accidents (169–195)	Automobile accidents (170 a, b, c)
24 States[1]											
January–June:											
1942	45.8	12.3	11.2	54	119	26.6	92	302	76	65	20.2
1941	48.9	(3)	27.5	61	118	28.7	98	316	81	69	22.4
1940	49.4	(3)	23.8	70	117	28.7	98	319	87	66	19.8
January–March:											
1942	45.1	12.6	15.4	68	119	28.4	96	323	79	65	22.1
1941	48.8	(3)	46.2	81	117	31.3	98	342	86	68	23.6
1940	49.1	(3)	36.4	91	119	31.4	105	344	93	67	19.1
April–June:											
1942	46.5	12.0	6.9	40	118	24.8	87	281	72	64	18.2
1941	49.1	(3)	9.0	41	118	26.2	89	290	76	69	23.8
1940	49.6	(3)	11.2	49	116	26.0	91	295	81	65	20.5
Industrial policyholders:[3]											
1942	43.0	10.8	5.5	36	103	29.6	63	[5] 166	[6] 59	49	18.1
1941	44.7	11.9	12.7	41	105	30.3	64	[5] 170	[6] 56	47	19.8
1940	46.4	12.3	11.8	47	102	31.3	64	[5] 172	[6] 61	42	15.3
Alaska:											
1942	341.8	5.3	18.5	135	80	7.9	66	217	40	254	10.6
1941	498.8	(3)	102.4	154	84	8.1	92	186	38	170	(7)
1940	440.5	(3)	8.2	175	79	(7)	98	233	16	137	(7)
Colorado:											
1942	55.7	10.6	11.6	92	120	18.3	97	264	77	87	24.6
1941	52.9	(3)	30.6	71	111	14.4	82	287	82	65	22.6
1940	51.8	(3)	16.1	87	121	17.9	89	269	77	78	21.6

Connecticut																									
1942	9 3	15 2	30	2 1	(7)	(7)	2 6	(7)	(7)	2	3	5	(7)		1	32 1	6 7	2 3	29	129	31 6	85	307	64	53	14.3
1941	9 6	12 3	36	3 2	2	(2)	1 8	2	(7)	4	1	2	1	(7)		34 5	(2)	8.1	37	132	35 0	84	333	69	59	17.3
1940	10 7	12 4	42	3 0	1	(2)	1 8	(7)	2	4	2	(7)	2	5		34.6	(2)	6 6	56	149	22 1	119	331	66	56	16.4
Delaware.																									
1942	12 1	18 4	36	8	(7)	(7)	3 7	2 9	(7)		(7)	(7)	(7)	7		58 2	12 5	8 1	62	131	30 2	111	400	131	72	22.1
1941	12 6	18 2	46	(7)	(7)	(2)	5 2	1 5	(7)	3 7	(7)	(7)	(7)	(7)		55 9	(2)	20 9	69	122	27 6	107	392	145	63	23.9
1940	12 7	16 3	56	5 5	(7)	(2)	4 5	2 3	(7)	3 0	(7)	8	(7)	(7)		50 4	(2)	18 1	72	143	33.1	110	378	137	56	21.1
District of Columbia																									
1942	10 8	23 5	42	2 5	2	(7)	12 7	2	2	2 9	(7)	2 6	2	(7)		63 0	20 3	3 6	67	133	28 0	73	280	94	64	16.5
1941	12 3	23 5	48	2 6	3	(2)	7 3	(7)	5	2 2	5	1 1	3	(7)		62.0	(2)	6.8	84	151	26 7	91	318	103	70	20.7
1940	13 4	20 9	48	2 0	6	(2)	7 4	3	3	1 8	(7)	9	6	(7)		66 2	(2)	11 6	97	149	33 3	99	357	132	63	19 6
Florida.																									
1942	11 6	17 1	59	4 0	2 0	2 5	8 9	1	1 6	2 5	4 5	1 0	1	1		46 4	17 7	20 0	56	97	20 6	114	281	76	95	29 9
1941	13 0	17 0	59	7 0	1 3	(2)	8 3	1	9	1 8	1 5	8	1 8	5		48 4	(2)	46 0	60	107	22 9	126	321	95	122	41.0
1940	13 2	15 3	60	7 8	1 1	(2)	6 9	1	9	2 0	6	4	2	4		54 8	(2)	44.7	69	99	20 8	125	335	96	99	38.8
Georgia																									
1942	8 6	19 6	57	4 2	4	1 8	5 6	1	1 0	2 9	3 4	7	3	1		37 9	13 0	20 4	60	60	11 8	85	160	97	58	19.6
1941	10 2	19 8	65	4.0	5	(2)	9 0	3	1 0	4 5	7 5	5	5	1		44 1	(2)	55 4	67	61	13 2	98	191	104	66	26.2
1940	10 3	18 9	61	5 4	7	(2)	6 2	4	1 5	2 8	1 0	4	3	1		49 7	(2)	47 9	84	59	11 3	98	199	103	59	20 0
Hawaii																									
1942	7 6	23 2	43	2 2	2 3	(7)	6 0	(7)	(7)	5 1	5	5	(7)	(7)		56 8	13 4	3 7	51	67	15 7	43	140	62	81	18 0
1941	7 2	22 2	47	1 9	1 4	(2)	12 7	(7)	9	1 9	2 3	(7)	5	5		80 7	(2)	2 8	45	81	16.9	54	127	54	70	19 2
1940	7 4	22 3	49	2 3	2 9	(2)	6 7	(7)	2 4	2 4	(7)	5	1 9	(7)		64 1	(2)	6 2	49	68	15 7	44	117	62	52	11 9
Idaho																									
1942	8 6	20 7	37	2.0	4	(7)	(7)	(7)	7	.7	7	4	(7)	4		14.5	2.6	12.2	55	74	14.8	85	244	55	74	15.9
1941	8 5	22 5	39	2 0	1 1	(2)	1 5	8	(7)	5 3	4	8	(7)	1 1		14 3	(2)	17 7	37	84	20 7	77	214	58	78	23 7
1940	9 2	22 1	36	4.0	4	(2)	3 8	1 1	4	1 5	1 5	1 5	(7)	1 5		21 0	(2)	17 2	39	89	16 8	63	242	58	87	27 5
Indiana																									
1942	11 0	17 7	39	3 2	2	2	3 0	5	3	1 6	4	1	2	4		38 6	10 1	20 1	58	121	12 8	136	255	81	74	29.5
1941	11 7	16 3	43	2 9	5	(2)	2 0	9	1 0	1 8	2 7	7	1	1		39 6	(2)	32 5	61	121	15 6	144	295	68	86	36.4
1940	12 2	16 1	46	3 5	4	(2)	2 8	1 5	8	2 8	1	2	1	5		40 0	(2)	34.4	76	123	17 4	152	340	86	74	28.8
Iowa																									
1942	9 6	17 3	37	2 2	(7)	2	2 1	2	2	1 6	1 0	1	1	4		14.9	6 3	10 6	41	134	24 3	107	286	61	63	16 7
1941	10 0	17 0	39	2.7	2	(2)	1 3	6	3	1 7	9	3	1	3		13 9	(2)	21 1	53	129	26 5	105	297	63	57	18 4
1940	10 6	15 5	42	4 1	2	(2)	1 6	9	9	6	7	7	5	1 1		17 4	(2)	26 6	59	135	29 0	116	312	72	61	16.8
Kansas																									
1942	10 6	17 2	40	2 5	(7)	3	3 2	4	(7)	1 2	2 3	3	1	1 0		24.1	10 6	21 1	40	125	28 0	116	310	90	75	20 4
1941	11 0	16 2	43	2 3	1	(2)	2 0	3	3	4 3	3 3	8	1	1 0		25 8	(2)	35 3	47	120	28 1	109	303	103	72	25 9
1940	10 7	14 8	41	3 9	(7)	(2)	2 3	4	8	1 8	1 7	7	1	1 0		24.7	(2)	29 4	44	125	27 7	107	292	105	71	21 8
Kentucky																									
1942	9 8	(2)	(2)	(2)	1 0	2.1	5 1	1 0	1 4	4.2	1 5	1.0	6	2		65 6	9 4	22 2	71	83	15 1	91	236	80	69	17 6
1941	10 9	20 0	60	4.9	1 4	(2)	6 2	1 1	1 0	8 3	8 4	1 1	9	.1		76.0	(2)	65 7	74	81	17 1	103	231	80	71	25.0
1940	10 7	20 4	55	4.8	1 8	(2)	5 4	1 1	1 5	4 5	8	1 3	1 0	.4		69 9	(2)	42 7	74	81	15 1	111	227	74	74	20 0
Louisiana																									
1942	9 7	19 6	58	3 4	1 5	1 7	8 3	1	1 6	2.5	2 0	8	5	.2		53 2	23 9	17 3	57	88	17 8	69	241	72	55	17.5
1941	10 4	20 3	65	4.6	2 4	(2)	9 6	3	1 1	2 1	.2	8	3	1		59 0	(2)	45 1	67	85	16.4	68	264	83	65	21 5
1940	14 8	18 9	69	6.3	2.5	(2)	11 3	.1	1.6	7 0	1.0	.6	4	.2		63 1	(2)	49.3	98	89	20 0	71	273	92	70	19.9

See footnotes at end of table

Provisional mortality from certain causes in the first 6 months of 1942, with comparative provisional data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1-2)	Dysentery (27)	Diarrhea and enteritis under 2 years (119)	Scarlet fever (8)	Diphtheria (10)	Whooping cough (9)	Measles (35)	Cerebrospinal (meningococcus) meningitis (6)	Acute poliomyelitis and polioencephalitis (36)	Acute infectious encephalitis (lethargic) (37)	Tuberculosis, all forms (13-22)	Syphilis (30)	Influenza (grippe) (33)	Pneumonia, all forms (107-109)	Cancer, all forms (45-55)	Diabetes mellitus (61)	Cerebral hemorrhage, embolism, and thrombosis (83, a, b)	Diseases of the heart (90-95)	Nephritis, all forms (130-132)	All accidents, including automobile accidents (169-195)	Automobile accidents (170 a, b, c)
24 States—Continued																									
Maine:																									
1942	12.6	19.9	44	2.0	.2	(7)	4.9	.7	.2	1.2	2.1	2.4	(7)	.9	31.3	7.5	13.6	64	145	32.7	120	367	84	80	19.3
1941	13.4	17.6	56	2.8	.2	(2)	5.0	.2	.5	2.6	1.4	1.2	.2	.5	33.8	(2)	33.5	74	154	32.1	132	400	99	71	18.9
1940	12.3	17.2	57	4.4	.5	(2)	5.2	1.2	.9	1.7	1.7	1.7	(7)	.2	28.7	(2)	16.1	61	145	31.8	133	370	95	65	17.5
Maryland:																									
1942	12.1	19.5	45	2.4	.2	.2	5.8	.2	.2	1.1	1.3	2.9	(7)	.4	77.1	20.2	6.7	67	134	31.3	97	361	121	77	24.2
1941	12.7	17.6	58	2.2	.4	(2)	4.6	.1	(7)	4.7	1.1	1.2	.1	.3	79.4	(2)	16.8	77	147	33.7	97	369	127	78	28.0
1940	13.1	16.3	52	3.1	.4	(2)	3.2	.4	.4	2.8	.1	.6	.2	.4	84.9	(2)	13.8	86	137	34.6	106	377	145	72	22.1
Montana:																									
1942	9.8	19.6	41	2.2	(7)	(7)	2.1	1.1	1.4	1.1	(7)	1.1	(7)	.7	35.7	12.1	7.5	53	107	12.5	97	260	57	73	19.6
1941	10.2	20.4	40	1.1	.4	(2)	3.2	2.2	2.5	1.1	.4	.4	1.4	.7	39.4	(2)	28.3	57	103	15.8	96	252	58	82	26.9
1940	10.3	20.0	41	3.9	.7	(2)	2.2	3.2	.7	.7	1.4	1.1	(7)	1.8	43.8	(2)	16.9	58	116	11.1	101	241	55	84	22.6
Nevada:																									
1942	15.3	20.5	55	(7)	1.8	3.5	10.5	1.8	(7)	12.3	1.8	3.5	1.8	3.5	73.8	12.3	7.0	77	128	15.8	114	304	58	271	67.9
1941	11.7	17.6	42	3.0	5.4	(2)	3.6	(7)	(7)	1.8	(7)	(7)	(7)	1.8	64.4	(2)	10.7	50	127	16.1	70	316	57	190	84.1
1940	12.3	18.5	44	5.9	(7)	(2)	5.4	(7)	1.8	(7)	(7)	1.8	1.8	(7)	63.6	(2)	9.1	78	114	21.8	69	306	69	149	61.8
New Mexico:																									
1942	9.7	25.2	92	2.6	.7	2.9	13.0	(7)	2.2	9.8	10.9	.4	.7	1.1	58.7	11.6	19.6	80	50	6.5	45	133	49	71	26.3
1941	10.3	27.1	85	3.7	1.8	(2)	17.4	.4	2.6	11.1	15.1	(7)	.4	.7	71.7	(2)	24.4	67	54	11.8	43	120	52	85	38.4
1940	10.4	33.1	71	4.6	1.1	(2)	14.7	(7)	1.9	10.2	.4	(7)	(7)	(7)	80.1	(2)	16.6	62	52	10.5	45	114	56	82	34.6
New York:																									
1942	11.1	16.5	33	2.0	.1	.2	2.7	.2	.1	.9	.1	.9	.1	.8	47.8	14.6	2.1	44	165	39.6	74	408	58	58	15.2
1941	11.6	15.1	35	2.3	.2	(2)	2.7	.3	(7)	.8	.6	.6	(7)	.9	46.8	(2)	6.6	55	158	43.5	76	418	64	58	16.1
1940	11.8	14.8	39	3.5	.1	(2)	3.1	.5	.1	1.2	.4	.1	(7)	1.0	40.1	(2)	4.5	57	157	43.1	77	415	70	60	14.8

North Carolina:																									
1942	8.8	23.1	54	3.8	.3	1.2	7.7	.3	.7	4.0	2.9	.5	.1	.2	46.1	7.7	11.9	60	57	13.4	86	167	81	66	25.1
1941	9.5	23.3	64	4.8	6	(2)	7.7	.3	1.6	6.3	4.3	.5	.3	.4	50.2	(2)	46.1	76	57	14.3	84	167	89	70	32.5
1940	9.6	22.4	62	6.0	.5	(2)	7.2	.4	2.9	2.3	.5	.5	.2	.3	52.4	(2)	37.9	79	59	15.4	91	159	107	60	21.7
North Dakota:																									
1942	6.8	17.9	42	3.2	.3	.6	7.3	.3	(7)	1.9	2.2	.3	(7)	1.9	22.5	1.9	6.0	34	82	17.4	73	176	35	39	9.8
1941	8.5	21.8	45	1.9	(7)	(2)	3.8	.6	1.6	2.2	.6	(7)	.3	1.3	19.9	(2)	18.0	47	88	20.6	74	215	45	65	13.0
1940	8.0	21.2	41	1.5	.9	(2)	5.0	1.6	1.6	2.2	.3	(7)	(7)	1.6	18.2	(2)	13.8	43	97	24.5	73	206	43	49	18.8
Ohio:																									
1942	11.2	18.0	40	2.1	.3	.2	3.2	.5	.3	2.2	.8	.2	.1	.1	41.5	11.7	11.7	55	134	32.5	109	334	79	80	27.7
1941	11.6	15.6	43	2.8	.3	(2)	3.5	.3	.2	2.8	2.8	.2	3	.7	43.8	(2)	23.6	55	136	31.8	108	331	79	88	29.9
1940	11.9	15.7	40	3.8	.8	(2)	3.3	.8	.5	1.7	(7)	.6	(8)	.5	42.6	(2)	20.5	67	136	31.8	117	334	83	83	24.6
Oklahoma:																									
1942	10.1	22.3	42	3.5	1.1	1.6	1.7	.3	2.1	2.3	8.3	.5	.7	.5	52.9	7.3	18.4	63	97	18.6	93	214	60	80	19.4
1941	9.3	19.3	56	3.1	.9	(2)	2.2	.3	2.4	7.3	1.1	.4	.5	.1	49.2	(2)	40.8	70	84	16.9	82	199	60	58	20.1
1940	9.1	17.8	48	3.6	1.5	(2)	3.4	.4	2.8	1.6	.3	1.4	1.1	.8	49.4	(2)	33.8	73	83	16.1	81	169	64	56	17.4
Pennsylvania:																									
1942	11.2	19.4	39	1.9	.3	.1	3.7	.4	.1	1.5	.8	.8	.1	.3	39.5	10.9	8.0	47	126	34.5	90	355	89	50	16.4
1941	11.5	17.7	41	2.4	.4	(2)	3.3	.4	.3	1.6	1.8	.3	.2	.8	42.4	(2)	18.2	54	124	38.3	90	367	94	55	16.5
1940	11.8	15.4	48	2.9	.5	(2)	3.7	.6	.5	1.3	1	1.0	2	.6	42.7	(2)	17.1	63	123	38.5	89	365	105	54	14.3
Tennessee:																									
1942	9.2	18.5	55	3.1	.3	1.0	3.5	.7	.5	2.3	1.9	5	.5	.5	72.6	11.9	24.1	68	75	13.2	85	186	61	61	17.5
1941	10.1	17.6	60	4.0	.8	(2)	5.3	.4	.8	6.5	7.4	1.2	.3	.8	84.1	(2)	55.8	81	79	14.3	81	183	66	57	19.1
1940	10.6	16.4	59	5.6	.8	(2)	3.6	.7	1.2	3.0	1.1	.7	.1	.4	78.8	(2)	50.1	95	71	16.5	89	212	64	61	14.9
Utah:																									
1942	8.9	26.7	35	1.6	.4	.7	2.5	1.1	(7)	.4	1.8	(7)	(7)	.4	12.9	5.4	11.2	38	96	14.4	61	269	58	79	26.3
1941	8.3	24.0	31	1.1	.4	(2)	3.6	(7)	(7)	2.2	(7)	.4	(7)	.4	12.3	(2)	15.2	31	78	22.5	60	262	58	72	28.7
1940	8.9	24.5	39	2.4	.4	(2)	2.2	2.2	(7)	2.9	1.5	.7	.4	.4	17.1	(2)	18.6	42	92	17.1	55	257	55	75	27.7
Vermont:																									
1942	11.5	18.2	47	2.2	.6	.6	4.5	.6	.6	3.4	.6	.6	(7)	(7)	32.0	4.5	9.5	55	138	29.2	121	371	80	33	11.2
1941	12.0	18.2	53	2.8	.6	(2)	5.6	.6	(7)	(7)	1.2	1.7	(7)	(7)	39.8	(2)	25.8	60	140	29.2	122	399	91	51	14.6
1940	11.8	18.5	35	4.5	1.1	(2)	4.5	(7)	(7)	2.8	(7)	.6	(7)	(7)	39.7	(2)	16.8	82	127	22.4	129	329	80	44	10.6
Virginia:																									
1942	10.7	21.0	59	3.2	.5	1.8	4.9	.4	1.1	4.3	1.0	1.9	.2	.6	59.6	16.5	16.4	71	85	19.3	109	254	87	77	25.0
1941	12.0	19.9	73	4.4	.4	(2)	5.0	.3	1.2	8.9	10.6	1.3	.3	.1	66.2	(2)	49.9	80	82	21.1	109	276	106	86	32.0
1940	11.8	19.1	64	4.9	.4	(2)	4.5	4	2.0	4.3	1.2	1.6	.3	.8	62.0	(2)	41.7	93	78	22.0	109	273	116	75	25.2

[1] The District of Columbia is included as a State. Estimated population July 1, 1942, 66,402,500. Includes all of the States listed below except Delaware, Kansas, and Oklahoma.

[2] Data not available.

[3] These data are taken from the July 1942 Statistical Bulletin published by the Metropolitan Life Insurance Co. The rates for 1941 and 1942 are subject to correction as they are based on provisional estimates of lives exposed to risk. Data do not include all diseases reported to the Public Health Service.

[4] Classified as diarrhea and enteritis, age not specified.

[5] International List (1940) titles 92, 93 c, d, e, and 95 only.

[6] Chronic nephritis only.

[7] No deaths reported.

[8] Less than 1/10 of 1 per 100,000 inhabitants.

DEATHS DURING WEEK ENDED SEPTEMBER 26, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 26, 1942	Corresponding week 1941
Data from 88 large cities of the United States:		
Total deaths	7,660	7,390
Average for 3 prior years	7,540	
Total deaths, first 38 weeks of year	316,488	319,431
Deaths per 1,000 population, first 38 weeks of year, annual rate	11.6	11.7
Deaths under 1 year of age	592	513
Average for 3 prior years	509	
Deaths under 1 year of age, first 38 weeks of year	21,564	19,872
Data from industrial insurance companies:		
Policies in force	65,043,991	64,496,432
Number of death claims	10,068	10,571
Death claims per 1,000 policies in force, annual rate	8.1	8.5
Death claims per 1,000 policies, first 38 weeks of year, annual rate	9.2	9.6

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED OCTOBER 3, 1942

Summary

The number of reported cases of meningococcus meningitis increased during the week from 39 to 48. More than one-half of the cases occurred in the Middle Atlantic and South Atlantic States, while one-fourth occurred in the Pacific States (6 in California—the largest number reported by any one State).

A slight decrease was reported in the incidence of poliomyelitis—217 cases as compared with 220 for the preceding week. The 5-year (1937–41) median for the week is 469 cases. The highest incidence is in the East North Central (64 cases) and the Middle Atlantic States (34). The number of cases reported to date this year (2,835 cases) is below that for the corresponding period of any other year since 1938.

Expected seasonal increases were recorded for diphtheria, influenza, measles, and scarlet fever. The accumulated totals to date this year for diphtheria, smallpox, and typhoid fever are below the figures for the corresponding period of any previous year for which comparable records are available. Of 959 cases of influenza (5-year median, 599), 379 occurred in Texas and 171 in South Carolina.

The number of reported cases of endemic typhus fever declined from 145 to 76. The latter is the lowest weekly figure since the week ended July 18. The indications are, however, that the total number of cases which will be reported this year will exceed that for any of the preceding five years.

Other reports received during the week include 3 cases of undulant fever in Maryland and 1 case in Pennsylvania, 29 cases of amebic dysentery, 279 cases of bacillary (118 in Texas and 73 in New York), 200 cases of unspecified dysentery (142 in Virginia and 33 in Arizona), 9 cases of infectious encephalitis, 1 case of leprosy (in California), 7 cases of Rocky Mountain spotted fever (all in the eastern States), 1 case of smallpox (in Wisconsin), and 12 cases of tularemia.

The death rate for 88 large cities in the United States increased rather sharply during the current week—from 10.7 per 1,000 population last week to 11.5 (same week last year, 10.7; 3-year average, 10.6). The cumulative rate to date is 11.6, as compared with 11.7 for the same period of 1941.

Telegraphic morbidity reports from State health officers for the week ended October 3, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41
	Oct. 3, 1942	Oct. 4, 1941		Oct. 3, 1942	Oct. 4, 1941		Oct. 3, 1942	Oct. 4, 1941		Oct. 3, 1942	Oct. 4, 1941	
NEW ENG.												
Maine	0	0	1	------	------	1	0	28	8	1	0	0
New Hampshire	0	0	0	------	------	------	0	7	0	0	0	0
Vermont	0	0	0	------	------	------	17	0	0	0	0	0
Massachusetts	3	4	8	------	------	------	40	53	52	3	3	0
Rhode Island	4	0	0	------	------	------	4	2	1	0	0	0
Connecticut	8	0	1	1	1	1	2	4	5	1	1	0
MID. ATL.												
New York	9	8	13	[1] 6	------	[1] 6	42	48	60	5	3	2
New Jersey	1	2	6	5	3	5	25	24	24	3	0	0
Pennsylvania	6	8	14	------	------	------	51	90	90	4	2	2
E. NO. CEN.												
Ohio	6	30	30	5	4	14	22		18	0	0	1
Indiana	4	20	20	14	23	14	7		3	0	0	0
Illinois	11	17	17	6	6	6	13		22	0	0	1
Michigan [2]	5	7	11	3	2	2	21		30	0	1	1
Wisconsin	1	0	0	34	25	25	48		39	0	0	0
W. NO. CEN.												
Minnesota	1	1	3	1	------	2	1	23	6	0	0	0
Iowa	7	4	5	------	5	5	12	6	6	0	0	0
Missouri	3	2	6	------	1	1	3	12	4	1	0	0
North Dakota	0	3	3	3	3	5	4	6	2	0	0	0
South Dakota	0	7	1	------	------	------	0	2	3	0	0	0
Nebraska	5	1	1	3	------	------	22	8	4	1	0	0
Kansas	2	2	5	9	8	2	5	4	4	0	1	1
SO. ATL.												
Delaware	1	1	0	------	------	------	0	0	0	0	0	0
Maryland [2]	5	2	6	2	------	3	8	14	5	5	1	1
Dist. of Col.	1	5	2	------	1	1	0	3	3	0	0	0
Virginia	20	36	39	111	183	32	7	24	16	4	0	0
West Virginia	8	5	10	3	7	7	2	53	5	2	0	1
North Carolina	76	120	115	------	------	2	5	35	21	0	1	0
South Carolina	31	26	26	171	110	139	2	18	3	3	0	0
Georgia	25	44	38	28	22	15	3	5	2	0	0	0
Florida	7	15	12	------	3	3	2	4	2	0	0	0
E. SO. CEN.												
Kentucky	12	14	24	2	------	8	0	9	12	0	0	1
Tennessee	24	10	26	19	5	14	6	38	38	0	0	0
Alabama	18	34	34	19	------	10	1	4	5	0	1	1
Mississippi [2]	10	24	19	------	------	------	------	------	------	0	0	0
W. SO. CEN.												
Arkansas	17	32	21	29	20	14	3	32	3	0	0	0
Louisiana	6	9	13	5	39	3	2	0	1	0	1	1
Oklahoma	9	17	12	10	28	28	1	2	2	1	0	0
Texas	49	53	43	379	357	135	4	10	13	1	0	2
MOUNTAIN												
Montana	4	16	0	1	2	2	1	3	16	0	0	0
Idaho	1	0	0	------	5	3	23	2	2	0	0	0
Wyoming	1	2	2	16	------	------	12	2	3	0	0	0
Colorado	17	2	5	19	23	7	8	16	8	0	0	0
New Mexico	5	0	3	1	------	------	0	4	4	0	0	0
Arizona	2	8	2	31	39	39	3	17	3	0	0	0
Utah [2]	0	0	0	------	4	2	54	5	2	1	0	0
Nevada	1	0	------	------	------	------	2	0	------	0	0	------
PACIFIC												
Washington	2	1	3	1	------	------	87	5	6	3	0	0
Oregon	3	1	3	5	6	7	30	14	8	3	0	0
California	17	11	12	17	39	16	42	77	72	6	1	1
Total	448	599	609	959	974	599	647	824	824	48	16	23
39 weeks	9,374	9,879	14,808	84,770	494,500	162,982	470,048	828,494	351,182	2,671	1,567	1,567

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 3, 1942, and comparison with corresponding week of 1941 and 5-year median—Continued

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41	Week ended—		Median 1937-41
	Oct. 3, 1942	Oct. 4, 1941		Oct. 3, 1942	Oct. 4, 1941		Oct. 3, 1942	Oct. 4, 1941		Oct. 3, 1942	Oct. 4, 1941	
NEW ENG.												
Maine	1	7	0	4	4	4	0	0	0	3	3	2
New Hampshire	0	2	0	6	3	3	0	0	0	0	0	0
Vermont	3	1	1	2	0	4	0	0	0	1	0	0
Massachusetts	1	10	4	94	81	40	0	0	0	11	6	2
Rhode Island	0	1	0	3	0	1	0	0	0	0	0	0
Connecticut	3	12	5	25	10	10	0	0	0	1	1	2
MID. ATL.												
New York	20	87	45	112	92	101	0	0	0	12	11	18
New Jersey	9	22	12	32	38	38	0	0	0	2	3	5
Pennsylvania	5	51	31	80	65	85	0	0	0	17	18	18
E. NO. CEN.												
Ohio	7	32	32	77	118	121	0	0	0	5	18	18
Indiana	3	1	4	35	36	68	0	0	1	1	4	4
Illinois	37	18	18	76	75	138	0	0	0	14	7	29
Michigan [2]	16	19	44	51	71	100	0	0	0	6	11	4
Wisconsin	1	2	8	57	66	66	1	0	0	1	1	2
W. NO. CEN.												
Minnesota	5	15	23	28	23	28	0	0	2	0	0	2
Iowa	5	2	16	37	34	34	0	0	1	1	3	3
Missouri	3	0	2	32	22	25	0	1	0	7	6	13
North Dakota	1	1	1	3	5	11	0	0	1	0	1	1
South Dakota	0	1	1	5	8	8	0	0	0	0	1	2
Nebraska	15	0	1	14	10	12	0	0	0	0	2	1
Kansas	9	0	4	29	41	56	0	0	0	2	2	5
SO. ATL.												
Delaware	2	0	0	3	4	3	0	0	0	1	0	0
Maryland [2]	1	18	2	17	18	18	0	0	0	7	5	6
Dist. of Col.	0	12	2	14	17	6	0	0	0	0	2	1
Virginia	2	10	3	41	15	24	0	0	0	6	7	18
West Virginia	0	1	1	43	21	35	0	0	0	2	8	14
North Carolina	8	7	3	78	77	77	0	0	0	2	4	10
South Carolina	3	8	1	13	15	13	0	0	0	2	7	11
Georgia	2	11	2	36	39	27	0	0	0	13	7	10
Florida	1	7	0	1	4	4	0	0	0	5	8	4
E. SO. CEN.												
Kentucky	3	6	6	29	32	52	0	0	0	5	11	11
Tennessee	7	27	2	75	54	49	0	0	0	14	18	11
Alabama	1	22	1	32	36	30	0	0	1	4	6	6
Mississippi [2]	1	7	1	18	13	13	0	1	0	2	7	7
W. SO. CEN.												
Arkansas	7	4	2	4	11	14	0	0	0	8	9	13
Louisiana	2	1	1	6	11	5	0	0	0	4	6	16
Oklahoma	2	3	3	10	16	14	0	0	1	7	6	6
Texas	4	4	7	32	13	24	0	1	1	22	17	31
MOUNTAIN												
Montana	0	1	1	10	8	9	0	0	0	1	0	0
Idaho	0	0	1	10	1	7	0	0	0	0	0	1
Wyoming	5	0	0	2	3	3	0	0	0	0	0	0
Colorado	2	1	1	10	15	18	0	1	1	2	12	12
New Mexico	1	1	1	1	8	4	0	0	0	9	1	7
Arizona	1	0	0	2	3	2	0	0	0	3	2	2
Utah [2]	1	1	2	7	6	6	0	0	0	0	0	0
Nevada	0	0	-----	0	0	-----	0	0	-----	1	0	-----
PACIFIC												
Washington	0	7	6	19	41	18	0	0	1	2	0	2
Oregon	0	8	3	3	10	10	0	0	1	0	0	1
California	17	5	8	67	74	95	0	0	1	7	9	9
Total	217	456	469	1,385	1,367	1,487	1	4	19	213	250	387
39 weeks	2,835	6,845	6,845	94,716	95,332	122,665	640	1,179	8,284	5,350	6,655	10,090

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 3, 1942—Continued

Division and State	Whooping cough, Week ended— Oct. 3, 1942	Whooping cough, Week ended— Oct. 4, 1941	Week ended Oct. 3, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	36	10	0	0	0	0	0	0	0	0	0
New Hampshire	2	14	0	0	0	0	0	0	0	0	0
Vermont	17	2	0	0	0	0	0	0	0	0	0
Massachusetts	113	138	0	0	3	0	0	0	0	0	0
Rhode Island	26	43	0	0	0	0	0	0	0	0	0
Connecticut	38	47	0	0	3	0	0	0	0	0	0
MID. ATL.											
New York	329	359	0	1	73	0	2	0	1	0	0
New Jersey	133	133	0	0	1	0	0	0	0	0	0
Pennsylvania	250	204	0	0	0	0	0	0	0	0	0
E. NO. CEN.											
Ohio	129	225	0	0	0	0	0	0	0	0	0
Indiana	30	10	0	0	0	0	0	0	0	0	0
Illinois	166	182	0	2	14	0	2	0	0	0	0
Michigan [2]	193	347	0	0	5	0	0	0	0	0	0
Wisconsin	187	206	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	34	47	0	3	0	0	0	0	0	1	0
Iowa	23	5	0	0	0	0	0	0	0	0	0
Missouri	5	9	0	0	0	0	0	0	0	0	0
North Dakota	22	27	0	0	0	0	0	0	0	0	0
South Dakota	0	1	0	0	0	0	0	0	0	0	0
Nebraska	7	0	0	0	0	0	0	0	0	0	0
Kansas	22	41	0	0	0	0	1	0	0	2	0
SO. ATL.											
Delaware	0	3	0	0	0	0	0	0	0	0	0
Maryland [2]	64	57	0	0	0	20	0	0	2	0	0
Dist. of Col.	6	15	0	0	0	0	0	0	0	0	1
Virginia	19	24	0	1	0	142	0	0	0	1	0
West Virginia	7	14	0	0	0	1	0	0	0	0	0
North Carolina	35	79	0	0	0	0	0	0	1	0	1
South Carolina	22	31	0	0	18	0	0	0	0	0	7
Georgia	10	55	0	0	2	0	0	0	0	0	22
Florida	3	16	0	0	0	0	0	0	0	0	3
E. SO. CEN.											
Kentucky	26	72	0	0	0	0	0	0	1	1	0
Tennessee	29	26	0	0	0	5	0	0	2	2	4
Alabama	8	15	0	0	0	0	0	0	0	0	7
Mississippi [2]	--------	--------	0	0	0	0	0	0	0	0	2
W. SO. CEN.											
Arkansas	3	27	0	3	12	0	0	0	0	2	5
Louisiana	3	2	0	4	1	0	0	0	0	0	3
Oklahoma	3	11	0	0	0	0	0	0	0	0	0
Texas	104	68	0	11	118	0	0	0	0	1	21
MOUNTAIN											
Montana	28	8	0	0	1	0	0	0	0	0	0
Idaho	1	0	0	0	0	0	0	0	0	0	0
Wyoming	11	7	0	0	0	0	0	0	0	0	0
Colorado	19	68	0	0	5	0	0	0	0	0	0
New Mexico	26	18	0	0	18	0	0	0	0	0	0
Arizona	3	4	0	0	0	33	2	0	0	0	0
Utah [2]	21	11	0	0	0	0	0	0	0	1	0
Nevada	0	4	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	18	55	0	0	0	0	0	0	0	0	0
Oregon	6	11	0	0	0	0	0	0	0	0	0
California	213	186	0	4	5	0	2	1	0	1	0
Total	2,450	2,937	0	29	279	201	9	1	7	12	76
39 weeks	139,386	165,432	-------	-------	-------	-------	-------	-------	-------	-------	-------

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended September 19, 1942

This table lists the reports from 88 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta Ga	1	0	9	0	0	0	2	0	3	0	0	0
Baltimore, Md	0	0		0	3	1	6	0	9	0	1	35
Barre, Vt	0	0		0	2	0	0	0	0	0	0	3
Billings, Mont	0	0		0	0	0	1	0	0	0	0	0
Birmingham, Ala	0	0	1	1	0	0	3	0	3	0	1	1
Boise, Idaho	0	0		0	0	0	0	0	0	0	0	0
Boston, Mass	0	0		0	1	3	6	1	20	0	0	39
Bridgeport Conn	0	0		0	0	0	0	0	0	0	0	1
Brunswick Ga	0	0		0	0	0	0	0	0	0	0	0
Buffalo, N Y	1	0		0	0	0	5	0	0	0	0	14
Camden, N J	3	0		0	0	0	1	0	0	0	0	5
Charleston, S C	0	0	1	0	0	0	0	1	0	0	0	2
Charleston, W Va	0	0		0	0	0	0	0	0	0	0	0
Chicago, Ill	11	0	1	0	7	0	18	22	19	0	3	180
Cincinnati, Ohio	1	0		1	0	0	1	2	5	0	0	26
Cleveland, Ohio	1	0	3	0	1	2	5	3	17	0	0	46
Columbus Ohio	0	0	1	1	1	0	2	0	11	0	0	2
Concord N H	0	0		0	0	0	0	0	1	0	0	0
Cumberland, Md	0	0		0	0	0	0	0	0	0	0	0
Dallas, Texas	2	0		0	0	0	3	0	1	0	0	6
Denver, Colo	4	0	10	0	4	0	5	0	2	0	1	7
Detroit, Mich	1	1		0	10	0	14	1	14	0	1	129
Duluth Minn	0	0		0	1	0	1	0	1	0	0	7
Fall River, Mass	2	0		0	0	0	1	0	4	0	0	7
Fargo, N Dak	0	0		0	0	0	0	0	0	0	0	0
Flint, Mich	0	0		0	0	0	0	0	0	0	0	6
Fort Wayne Ind	0	0		0	0	0	1	0	0	0	0	0
Frederick, Md	0	0		0	0	0	0	0	0	0	0	0
Galveston, Texas	0	0		0	0	0	2	0	0	0	0	1
Grand Rapids, Mich	0	0		0	0	0	0	0	1	0	0	8
Great Falls, Mont	0	0		0	0	0	0	0	0	0	0	0
Hartford, Conn	0	0		0	1	0	1	5	2	0	1	17
Helena, Mont	0	0		0	0	0	0	0	1	0	0	0
Houston, Tex	2	0	1	0	0	0	4	1	1	0	1	4
Indianapolis, Ind	2	0		0	2	0	7	0	6	0	0	18
Kansas City Mo	0	0		0	2	0	2	1	7	0	0	0
Kenosha, Wis	0	0		0	1	0	0	0	2	0	0	3
Los Angeles, Calif	4	0	6	0	9	1	12	3	6	0	0	23
Lynchburg, Va	0	0		0	0	0	1	0	0	0	0	1
Memphis, Tenn	1	0		1	2	0	1	1	1	0	0	13
Milwaukee Wis	0	0		0	7	0	7	0	7	0	0	38
Minneapolis Minn	0	1		1	1	0	2	3	7	0	0	3
Missoula, Mont	0	0		0	0	0	0	0	0	0	0	2
Mobile, Ala	1	0		0	0	0	2	1	1	0	0	0
Nashville, Tenn	0	0	1	0	0	0	2	0	1	0	0	4
Newark, N J	0	0	1	0	1	0	0	1	4	0	0	15
New Haven, Conn	0	0		0	0	0	0	0	3	0	0	13
New Orleans, La	0	0		0	0	1	9	0	1	0	0	1
New York, N Y	3	0	3	2	9	7	40	11	35	0	3	171
Omaha, Nebr	1	0		0	1	0	2	1	1	0	0	0
Philadelphia, Pa	1	0		0	3	1	16	1	19	0	3	113
Pittsburgh, Pa	0	0	2	1	1	0	7	0	3	0	2	9
Portland, Maine	0	0		0	3	5	2	0	0	0	0	15
Providence R I	0	0		0	1	0	1	0	1	0	1	17
Pueblo, Colo	1	0	--	0	0	0	2	0	2	0	0	0

City reports for week ended September 19, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Racine, Wis	0	0	------	0	1	0	1	0	5	0	0	3
Raleigh, N. C	0	0	------	0	0	0	1	0	0	0	0	6
Reading, Pa	0	0	------	0	0	0	1	0	0	0	0	6
Richmond, Va	1	0	1	1	0	0	4	0	2	0	0	0
Roanoke, Va	0	0	------	0	4	0	0	0	0	0	0	0
Rochester, N. Y	0	0	------	0	0	0	3	2	2	0	2	18
Sacramento, Calif	1	0	------	0	1	0	0	0	2	0	1	6
St. Joseph, Mo	0	0	------	0	0	0	1	0	1	0	0	0
Saint Louis, Mo	0	0	------	0	8	0	15	1	3	0	3	3
St. Paul, Minn	0	0	------	0	1	0	1	1	4	0	0	29
San Antonio, Tex	0	0	1	1	0	0	2	0	1	0	1	1
San Francisco, Calif	0	0	------	1	7	0	6	0	3	0	0	7
Savannah, Ga	0	0	3	1	0	0	1	0	0	0	0	1
Seattle, Wash	2	0	------	0	5	0	0	0	1	0	0	12
Shreveport, La	0	0	------	0	0	0	1	0	0	0	1	0
South Bend, Ind	0	0	------	0	0	0	0	0	0	0	0	0
Spokane, Wash	0	0	------	0	4	0	1	1	3	0	0	0
Springfield, Ill	0	0	------	0	1	0	1	0	0	0	0	9
Springfield, Mass	0	0	------	0	0	1	4	0	7	0	0	3
Superior, Wis	0	0	------	0	1	0	0	0	0	0	0	1
Syracuse, N. Y	0	0	------	0	1	0	1	1	1	0	0	16
Tacoma, Wash	0	0	------	0	6	0	0	0	1	0	0	0
Tampa, Fla	0	0	------	0	0	0	0	0	0	0	0	0
Terre Haute, Ind	1	0	------	0	0	0	1	0	0	0	0	1
Topeka, Kans	0	0	------	0	0	0	1	0	3	0	0	0
Trenton, N. J	0	0	------	0	1	0	0	0	0	0	0	6
Washington, D. C	1	0	------	0	1	1	5	0	8	0	1	23
Wheeling, W. Va	0	0	------	0	0	0	0	0	1	0	0	0
Wichita, Kans	0	0	------	0	0	0	2	0	3	0	0	2
Wilmington, Del	0	0	------	0	1	0	2	3	2	0	0	2
Wilmington, N. C	1	0	------	0	0	0	0	0	1	0	0	5
Winston-Salem, N. C	1	0	------	0	2	0	0	0	1	0	0	0
Worcester, Mass	0	0	------	0	0	1	6	1	11	0	0	53

Anthrax—Cases: Philadelphia, 1.

Dysentery, amebic—Cases: Cleveland, 4; Newark, 1; New York, 2; Philadelphia, 1; Rochester, 1.

Dysentery, bacillary—Cases: Baltimore, 2; Detroit, 12; Los Angeles, 11; Nashville, 6; New Haven, 1; New York, 20; Philadelphia, 2; Richmond, 2; Syracuse, 1.

Rocky Mountain spotted fever—Cases: Kansas City, 2.

Typhus fever—Cases: Atlanta, 2; Dallas, 1; Houston, 3; Mobile, 2; New Orleans, 2; Richmond, 1; Savannah, 4; Shreveport, 1; Winston-Salem, 2.

Rates (annual basis) per 100,000 population for the group of 88 cities in the preceding table (estimated population, 1942, 33,892,618)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Sept. 19, 1942	7.85	6.92	1.85	18.31	39.60	44.31	0.00	4.15	187.60
Average for week 1937–41	11.04	6.53	1.55	[1] 23.79	39.80	43.38	0.31	9.17	171.33

[1] Median.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended September 5, 1942.—During the week ended September 5, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		2		2	4				1	9
Chickenpox		2		34	27	12	3	1	24	103
Diphtheria		17		17	1	1	2		2	40
Dysentery				15					2	17
Encephalomyelitis						2	1			3
German measles				2	5			1	1	9
Influenza		15			7		1			23
Lethargic encephalitis							1			1
Measles		1		16	6	3	13		2	41
Mumps		14	1	7	81	9	27	6	42	187
Pneumonia		2			5				8	15
Poliomyelitis		14	8	8	6	2	2		7	47
Scarlet fever		8	4	26	50	3	11	27	13	142
Tuberculosis		3	11	164	25	75	9	60	9	356
Typhoid and paratyphoid fever		1	2	16	1	1	2		3	26
Undulant fever		1		1	1				1	4
Whooping cough		2		326	42	19	5	10	39	443
Other communicable diseases		4			256	25			2	287

CHILE

Santiago—Cerebrospinal meningitis.—Following is a table showing the number of cases of cerebrospinal meningitis and deaths from the same cause reported in Santiago, Chile, by 4-week periods from the beginning of the present epidemic:

4 weeks ended—	Cases	Deaths	4 weeks ended—	Cases	Deaths
1941—Oct. 4 [1]	45	11	1942—Continued.		
Nov. 1	65	19	Apr. 18	36	7
Nov. 29	73	15	May 16	45	12
Dec. 27	73	28	June 13	84	16
1942—Jan. 24	57	17	July 11	250	42
Feb. 21	33	12	Aug. 8	727	69
Mar. 21	25	8	Sept. 5	919	

[1] For the period Dec. 29, 1940, to Sept. 6, 1941, only 9 cases with 2 deaths were reported.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Indochina—Laos.—During the period September 1–10, 1942, 1 fatal case of plague was reported in Laos, Indochina.

Typhus Fever

Algeria.—During the period August 11–20, 1942, 189 cases of typhus fever were reported in Algeria.

Iraq.—During the week ended August 15, 1942, 4 cases of typhus fever were reported in Iraq.

Morocco.—During the week ended September 5, 1942, 40 cases of typhus fever were reported in Morocco.

Yellow Fever

Ivory Coast.—On September 17, 1942, 1 suspected case of yellow fever was reported in Ivory Coast, no specific location being given.

COURT DECISION ON PUBLIC HEALTH

Hard clams—prohibition of digging in certain waters—action upheld.[1]—(New York Supreme Court; *Matter of De Roche;* decided 1942.) In March 1942 the New York State Conservation Commission by an order and the New York City Board of Health by a resolution prohibited the digging of hard clams in Raritan Bay. By statute authority was vested (*a*) in the conservation commission to certify those lands from which shellfish could be taken for use as food and (*b*) in the board of health to regulate all matters affecting health in the city. The petitioner sought to have the order and resolution rescinded and to have the commission and board (*a*) directed to reopen the bay for clam digging, (*b*) restrained from enforcing the order and resolution, and (*c*) directed to fix and determine on a scientific, fair, accurate, and reasonable basis a standard of purity and sanitary condition for hard clams to be taken or sold and for the waters overlying such hard clams. The power of the commission or the board to act was not challenged by the petitioner but he contended that their action treating a scientific subject had been unscientific and, as a result, was arbitrary, capricious, and unreasonable and, consequently, illegal.

The returns filed by the respondent commission and board showed that the waters were made available for removal of hard clams on January 1, 1940, and continued as an operating area for clammers until the above-mentioned order and resolution were made. When the waters were opened to the clam industry the two respondents made tests and came to certain conclusions based upon standards of safety accepted by the various authorities then vested with control. In making these tests the respondents had collaborated with a bacteriologist affiliated with those businessmen interested in the clam industry and at that time (autumn, 1939) the unanimous opinion was that "where tested waters showed a score of 70 coliforms per 100 milliliters that degree of pollution indicated an absence of pathogenic organisms or at least that condition could be assumed with safety." Later there was an unaccountable rise in the coliform scores in the bay and the authorities of the States of New York and New Jersey and of the city of New York requested the United States Public Health Service to make a comprehensive investigation of the waters of

[1] This is believed to be the first court decision recognizing the coliform scoring of waters as a criterion of shellfish safety.

Raritan Bay with relation to the harvesting for human consumption of hard clams found therein. A report was made by the Public Health Service on the public health aspects of clamming in Raritan Bay and the Supreme Court of New York said that an examination of the report "reveals a carefully prepared document and reflects most deliberate planned action wherein the utmost care was exercised in making the tests and performing experiments to the end that an accurate, fair, convincing result would be obtained. The report shows the bay waters to be dangerously polluted with sewage exposing the public to typhoid fever." This report, together with experiments, tests, and reports made by the respondents themselves, formed the basis for the prohibitory action attacked by the petitioner. The petitioner argued that the report failed to show a single contaminated clam taken from the bay but, in the court's view, that was an unimpressive criticism. The action of the respondents was upheld, the court stating in part as follows: "The presence of polluted waters is sufficient. Authorities should not wait until contamination becomes real. The only point before the court is whether respondents in adopting the resolution and making the order acted arbitrarily, capriciously or unreasonably, which is the charge of petitioner. Respondents have acted. The law authorized their acts. Their competence is not questioned. They have decided after investigation and careful consideration. In their returns they set forth the sources of information which prompted them to act. I find that these sources are unassailable. On the merits this court approves of the prohibitory action, but if it did not, on the showing herein presented, it would be unwarranted in substituting its judgment for that of the administrative authorities charged with the responsibility."

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

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PREVALENCE OF DISEASE

Public Health Reports

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PREVENTION AND TREATMENT OF AGRANULOCYTOSIS AND LEUKOPENIA IN RATS GIVEN SULFANILYLGUANIDINE OR SUCCINYL SULFATHIAZOLE IN PURIFIED DIETS

By S. S. Spicer, *Assistant Surgeon,* Floyd S. Daft, *Senior Biochemist,* W. H. Sebrell, *Surgeon,* and L. L. Ashburn, *Passed Assistant Surgeon, United States Public Health Service*

Agranulocytosis with accompanying leukopenia has been reported by various investigators as an occasional result of the clinical use of sulfonamide drugs (*1*). Abnormalities in the white blood cell picture of experimental animals have been described for monkeys, rats, and dogs which were given certain deficient diets. The blood dyscrasia in monkeys has been called nutritional cytopenia or vitamin M deficiency (*2*, *3*, *4*) and that in rats panmyelophthisis (*5*). Both have been described as involving all of the blood elements—lymphocytes, granulocytes, erythrocytes and platelets. In dogs (*6*, *7*, *8*) a leukopenia and an anemia were noted.

During the past year, we have made extensive use of sulfaguanidine (sulfanilylguanidine) and, more recently, of sulfasuxidine (succinyl sulfathiazole) in nutrition experiments. Rats have been fed purified diets into which these drugs, singly, were incorporated. A report has been made on the occurrence of hyaline sclerosis and calcification of blood vessels (*9*).[1] Another report, describing other pathology, including a dermatitis which is cured by biotin, is in press (*10*). Agranulocytosis or granulocytopenia, leukopenia, and hypocellularity of bone marrow also have developed with regularity in these animals. Anemia has been found, but with comparative infrequency. This syndrome can be prevented to a large extent by the inclusion of whole dried liver in the diet. Treatment with whole dried liver or liver extract also has proved successful.

EXPERIMENTAL

Twenty-one-day-old albino rats at weaning were placed on diet 566, diet 566–S, diet 566–SL, or diet 698. The composition of these diets is given in table 1. Each rat was given a daily supplement of 100

[1] This report mentioned only 7 animals. Our series has now been extended to include 30 animals which have shown this pathology.

micrograms of thiamine, 200 micrograms of riboflavin, 100 micrograms of pyridoxine hydrochloride, 200 micrograms of calcium pantothenate, 1 mg. of niacin and 20 mg. of choline chloride.

TABLE 1

	Diet No.			
	566	566-S	566-SL	698
	Percent	*Percent*	*Percent*	*Percent*
Sulfaguanidine		1	1	
Sulfasuxidine				1
Glucose [1]	73	72	62	72
Whole dried liver			10	
Casein, purified [2]	18	18	18	18
Cod liver oil	2	2	2	2
Wesson oil	3	3	3	3
Salt mixture No. 550 [3]	4	4	4	4

[1] "Cerelose."
[2] Labco or Smaco "vitamin-free" casein
[3] Prepared according to the directions of Osborne and Mendel (*11*), except that the sodium fluoride is reduced to 1 percent of their level and 0.318 gm. of $Cu SO_4 . 5 H_2O$ (Eqivalent to 0.2 g. anhydrous $Cu SO_4$) is added.

The average rate of gain in weight of representative rats on these four diets is shown in chart 1.

Forty rats receiving diet 566–S or diet 698 have been allowed to die, no change being made in the diet or supplement. Forty others have been given an additional supplementary feeding of whole dried liver, or liver extract [2] beginning after the weight gain of the animal had almost or completely ceased.

At various times total and differential white cell counts, hematocrit and hemoglobin determinations, and, occasionally, total red cell counts were made on the tail blood of representative animals. Hemoglobin was determined by the method of Sanford et al. (*12*), and hematocrit with the Van Allen hematocrit using 1.3 percent sodium oxalate. Total white counts were carried out in duplicate. Differential counts were made on smears stained with Wright's stain. One hundred cells on each of two slides were identified according to descriptions given by Scarborough (*13*).

The results of a number of blood examinations are given in tables 2, 3, 4, and 5. Table 2 shows data for rats on a stock diet [3] or on control diet 566; table 3, for rats receiving sulfaguanidine or sulfasuxidine (diets 566–S or 698); table 4, for rats receiving liver with sulfaguanidine (diet 566–SL); and table 5, for rats on diet 566–S or 698, treated with liver or liver extract.

[2] Eli Lilly's 343 or Lederle's 80-percent alcohol insoluble.
[3] Diet 516. The composition of this diet was given in an earlier publication (*14*).

cases by either hospitals or physicians. These, added to the reported cases, make the total resident cases 5,946.

The number of reported cases and recorded deaths are listed by residence, sex, and color in table 2. Also shown are the ratios of resident cases to resident deaths, and the crude prevalence and mortality rates for residents of the area.

TABLE 2.—*Number of reported cases of cancer and number of cancer deaths, by sex, color, and residence, with prevalence and mortality rates for residents, San Francisco and Alameda Counties, Calif., 1938*

	White		Colored		Total
	Male	Female	Male	Female	
Reported cancer cases	3,348	4,374	86	51	7,859
Residents	2,362	3,291	74	46	5,773
Nonresidents	986	1,083	12	5	2,086
Reported cancer deaths [1]	983	938	40	13	1,974
Residents reported as a case	733	768	34	11	1,546
Nonresidents reported as a case	163	89	2	1	255
Residents not reported as a case	87	81	4	1	173
Total resident cases [2]	2,449	3,372	78	47	5,946
Total resident deaths [3]	820	849	38	12	1,719
Ratio of resident cases to deaths	3.0	4.0	2.1	3.9	3.5
Prevalence rate per 100,000 population (residents)	444.9	639.7	223.2	253.2	525.7
Mortality rate per 100,000 population (residents)	149.0	161.1	108.7	64.7	152.0

[1] Obtained from the death certificates on file with the Boards of Health in San Francisco and Alameda Counties. These figures include all recorded deaths where cancer appeared on the death certificate, with the exception of a small number among nonresidents not reported as a case.
[2] Reported resident cases plus resident deaths not reported as a case.
[3] Irrespective of whether or not reported as a case.

The prevalence rate for both sexes combined, all colors, was 525.7 per 100,000 residents. The rate was higher for females than for males, and considerably higher for white than for colored.

In table 3, the San Francisco-Alameda case rate and case death ratio are compared with those of the seven areas previously reported in this series.

The crude prevalence rate for the San Francisco-Alameda area (525.7 per 100,000) is considerably higher than that for any of the areas previously surveyed. It will be recalled that the crude cancer prevalence rate of an area, computed by dividing the total number of cancer cases by the total number of persons in the population, is in part a reflection of the age composition of the population. Of two areas having the same number of residents and the same age-specific cancer prevalence rates, the one that has the larger proportion of its population in the older age groups, where cancer is most prevalent, will have a greater number of cases. Therefore, to a certain extent, the high rate in San Francisco-Alameda is attributable to the unusually old population in this area.

Unfortunately, the exact influence of the age composition factor on these prevalence rates cannot be determined as yet, because 1940

population figures by age have not been released by the Bureau of the Census. However, it seems certain that even after the rates have been adjusted for age this area will be among those with the highest rates.

TABLE 3.—*Prevalence rates of cancer cases among residents in each of eight study areas, with the ratio of cases to deaths*

Survey area (designated by its principal city)	Ratio of cases to deaths	Resident prevalence rate per 100,000 population	Survey area (designated by its principal city)	Ratio of cases to deaths	Resident prevalence rate per 100,000 population
San Francisco-Alameda	3.5	525.7	Chicago	2.6	344.9
New Orleans	3.6	427.1	Pittsburgh	2.9	332.4
Dallas-Fort Worth	4.7	394.0	Detroit	3.2	282.6
Atlanta	5.3	389.7	Birmingham	3.5	242.9

Other factors affecting prevalence rates are the completeness with which cases are diagnosed, treated, and then kept under observation if cured. Cancer control programs and the availability of excellent medical facilities in San Francisco-Alameda have probably played an important part in reducing the proportion of undiagnosed cases of cancer. Of course, as this proportion decreases, prevalence rates become higher. Also, this area ranked third among the surveyed areas in the proportion of resident cases reported which were under observation only during the study year. Twenty percent of the resident cases reported had required no treatment in 1938, but had visited the reporting physician or hospital to be examined for possible recurrences. Since the prevalence rates are based on these cases, as well as on cases that received treatment, they increase as the proportion of cured and arrested cases kept under observation increases. These rates, therefore, are affected by the completeness with which all cases are brought to medical attention for diagnosis and are kept under observation after treatment has been concluded.

As indicated in table 3, the rank of the areas in order of magnitude of prevalence rates is considerably different from their rank in order of magnitude of case-death ratios. The defects of the case-death ratio when used as a measure of prevalence have been discussed fully in an earlier paper (*5*) and will not be considered here. As will be seen later, there is considerable variation in the fatality of cancer, depending on the organ of the body which it attacks. It is largely as a result of this that the southern areas listed in table 3 have the largest number of cases per death, since they have many cases of relatively nonfatal skin cancers.[4] The ratio of cases to deaths in San Francisco-Alameda was higher than that of the northern areas surveyed. Some

[4] When, as in Atlanta, there are large numbers of skin cancer cases and a large part of the cured and arrested cases are kept under observation, the result is an exceptionally high case-death ratio.

part of this higher case-death ratio can be traced to the greater number of skin cancers and to the higher proportion of cured and arrested cases which were reported in this area.

The completeness of the reporting of diagnosed cancer cases is, of course, an important factor in the determination of the reliability of cancer incidence data. Another important factor is the accuracy with which cancer diagnoses are made. Table 4 shows the percentages of cancer cases of each primary site with microscopically confirmed diagnoses. In over 71 percent of the cases of all sites, the diagnoses were microscopically confirmed, a fairly high proportion in comparison with the other survey areas. The proportion of cases so confirmed for each primary site is associated with the accessibility of the tumor, and, as a result, varies considerably among the sites. Thus, uterus, breast, urinary system, and "other genital" rank high in percentages of microscopically confirmed diagnoses, whereas the digestive tract ranks lowest. Skin cancers, although easily accessible for tissue removal, are frequently diagnosed by clinical evidence only. This accounts for the finding that microscopic examinations were made in a relatively low percentage (61) of skin cancer cases. Cases reported by hospitals were diagnosed microscopically more frequently than were those reported by physicians only.

TABLE 4.—*Percentage of reported cancer cases with microscopically confirmed diagnosis, by primary site and whether reported by a hospital, San Francisco and Alameda Counties, Calif., 1938*

Primary site	Percentage of cases of each site microscopically diagnosed		
	Cases reported by—		
	Doctors only	Hospitals [1]	All sources
Buccal cavity	62.1	80.8	73.4
Digestive tract	47.0	66.6	60.9
Respiratory system	53.3	71.8	67.2
Uterus	71.1	90.0	85.6
Prostate	54.2	69.3	65.3
Other genital system	85.5	86.7	86.3
Urinary system	69.1	84.1	79.6
Breast	76.0	84.0	80.8
Skin	50.7	73.9	61.0
Brain	(2)	75.9	71.3
Bones	(2)	67.6	62.5
All other sites	64.8	75.8	72.4
All sites	60.5	77.3	71.5

[1] This group includes cases reported by hospitals only.
[2] There were too few cases in this group to yield a reliable percentage.

The most frequent primary sites of cancer reported were the digestive tract, skin, and buccal cavity among males, and the breast, uterus, and digestive tract among females. It will be noted that the digestive tract, the most frequent site of cancer in males, was only third most frequent in females (table 5).

TABLE 5.—*Percentage distribution by primary site of reported cases and recorded deaths from cancer, by sex; residents of San Francisco and Alameda Counties, Calif., 1938*

Primary site	Cases [1]		Deaths	
	Male	Female	Male	Female
Buccal cavity	13.2	2 8	4.7	1.3
Lip	7.6	.8	.5	----------
Tongue	1.6	.6	1.3	.8
Mouth	.9	.2	.5	.1
Jaw	.5	.1	.6	.2
Pharynx	.6	.1	8	.1
Others	2.0	1.0	1.0	.1
Digestive tract	32.5	18.7	56.2	36.9
Esophagus	1 9	.4	3.5	.9
Stomach and duodenum	12.5	5.2	24.3	12.9
Intestines	6 7	5 6	9.8	9.1
Rectum and anus	7.2	4 3	8.2	4.4
Liver and biliary passage	1.7	1.6	5 1	5.1
Pancreas	2.1	1.2	4.5	3.5
Others	.4	.4	.8	1.0
Respiratory system	7.3	1 3	11.4	2.8
Larynx	2.1	.1	2.2	.2
Lungs and pleura	3 0	.8	5.7	2 2
Others	2.2	.4	3.5	.4
Prostate	9.3	----------	10 6	----------
Uterus	----------	21 2	----------	19 0
Other genital system	2.1	6 4	.7	7 8
Urinary system	6 4	2.5	6.4	2 8
Breast	.4	29 7	.1	18.6
Skin	20 9	10.9	1.5	8
Brain	1 1	.6	.7	.3
Bones	1.6	1.2	1.2	.9
All other sites	5.2	4 7	6.5	8.8
All sites	100 0	100 0	100 0	100 0

[1] These are all cases reported, and so include cases which died before the end of the study year as well as those alive at the end of the year. If the cases which died before the end of the year were excluded the change would increase the relative frequency of the less fatal sites and decrease that of the more fatal.

These primary sites are not equally accessible, nor do the different types of lesions respond equally well to treatment. For example, skin cancer is the most accessible, is usually diagnosed early in its development, and is, in general, the least malignant in type, while cancer of the digestive tract is often diagnosed late in its development and responds poorly to treatment. As a result, the frequency of occurrence of cancers of specific sites among living cases will not be the same as among dead cases. Thus, cancer of the digestive tract, which made up 32.5 and 18.7 percent of the living cases among males and females, respectively, was responsible for 56.2 and 36.9 percent of the recorded deaths. In contrast, skin and breast cancers were far less frequent among the dead than they were among the living cases. Cancers of the prostate and uterus were found in approximately equal proportions among the living and dead cases (fig. 1).

Of the reported male cases in San Francisco-Alameda, 3.7 percent occurred in persons under 30 years of age, and 45.5 percent in persons

under 60 years of age (table 6). Only 2.7 percent of the female cases were in persons under 30, but thereafter female cases tended to develop at earlier ages than the male, since 54.5 percent of them were under 60. In all of the areas surveyed, greater proportions of female than of male cases occurred before the age of 60.

Comparison of the proportion of cases occurring at ages over 60 in San Francisco-Alameda with those of the areas previously reported reveals that this proportion was relatively very high in San Francisco-

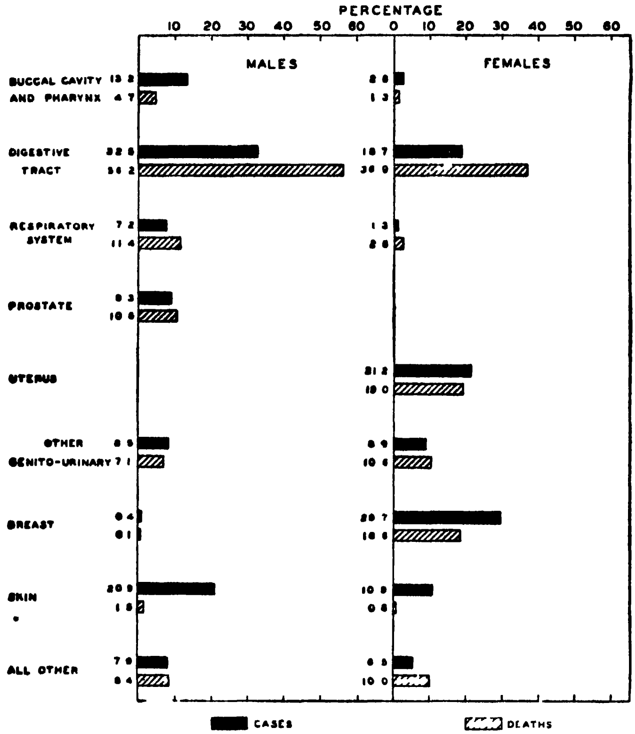

FIGURE 1.—Percentage distribution of reported cases and recorded deaths from cancer, by primary site and sex, among residents, San Francisco and Alameda Counties, Calif., 1938

Alameda. This is, of course, a reflection of the age distribution of the populations.

The frequency of occurrence of cancer of certain organs varies with age. Among the male cases in San Francisco-Alameda cancer of only three sites developed at early ages in significant numbers; 53 percent of the brain cases, 51 percent of genital cases other than prostate, and 44 percent of the bone cases were in persons under 45 years of age, whereas the corresponding percentage for all cases was 13.

Approximately half the male cases of cancer of the buccal cavity, digestive tract, urinary system, skin, and brain appeared in persons

TABLE 6.—*Percentage distribution of all reported cases of cancer of known age by age and sex; San Francisco and Alameda Counties, Calif., 1938*

Age group	Percent of cases of known age in each age group		Age group	Percent of cases of known age in each age group	
	Males	Females		Males	Females
0-9	0.3	0.2	60-69	30.0	25.4
10-19	1.0	.6	70-79	19.4	15.7
20-29	2.4	1.9	80-89	4.9	4.0
30-39	4.8	7.3	90 and over	.2	.4
40-49	10.8	18.5			
50-59	26.2	26.0	All known ages	100.0	100.0

aged 45–64, and over 60 percent of the cases of the respiratory system were in this age group. The site showing the greatest concentration o cases in the ages 65 and over was the prostate (71.7 percent), but skin cancers also had a larger than average proportion of cases among the aged (46.7 percent).

TABLE 7.—*Percentage distribution by age of reported cases of cancer by primary site, males only, San Francisco and Alameda Counties, Calif., 1938*

Primary site	Percent of cases of each site in each age group									Number of cases of known age
	Under 15	15-24	25-34	35-44	45-54	55-64	65-74	75 and over	All ages	
Buccal cavity	0.2	0.4	3.4	10.5	21.3	29.6	25.3	9.2	100.0	446
Lip	---	---	3.7	12.7	24.9	26.1	22.9	9.8	100.0	245
Others	.5	1.0	3.0	8.0	16.9	33.8	28.4	8.5	100.0	201
Digestive tract	.2	.3	1.9	7.0	17.8	33.4	28.2	11.3	100.0	1,063
Stomach and duodenum	---	---	2.3	8.8	16.9	32.6	29.0	10.4	100.0	396
Intestines	.5	.5	2.9	5.9	16.2	33.3	27.0	13.7	100.0	204
Rectum, anus	---	.4	1.5	5.8	19.6	33.1	20.8	9.8	100.0	275
Others	.5	.5	.5	5.9	18.6	35.6	2[illegible].5	12.8	100.0	188
Respiratory system	.8	1.7	2.5	8.0	25.1	35.6	22.6	3.8	100.0	239
Lungs, pleura	.7	2.1	1.4	10.6	24.8	36.2	20.6	3.5	100.0	141
Others	1.0	1.0	4.1	4.1	25.5	34.7	25.5	4.1	100.0	98
Prostate	---	---	.3	.7	5.0	22.3	38.5	33.2	100.0	301
Other genital sites	1.5	9.1	22.7	18.2	7.6	16.7	18.2	6.1	100.0	66
Urinary system		1.4	2.8	4.2	20.7	29.6	27.7	13.6	100.0	213
Skin	.2	1.5	2.1	6.3	16.9	26.3	29.1	17.6	100.0	608
Brain	12.3	8.8	15.8	15.8	33.3	12.3	1.8	---	100.0	57
Bones	3.8	17.0	13.2	9.4	17.0	15.1	13.2	11.3	100.0	53
All other sites	4.1	4.6	6.7	12.4	21.6	29.9	12.4	8.2	100.0	194
All sites	.7	1.5	3.2	7.4	17.9	29.2	26.6	13.3	100.0	3,240

For females, the ages at which the various organs were attacked by cancer are shown in table 8. More o the cases of the respiratory system and skin occurred in females over 65 years of age than in males, but with the exception of these sites, in addition to those occurring exclusively in females, the age distributions of the cases among females follow those among males quite closely. Over 55 percent of the cases of the uterus, urinary system, and breast were in persons in

the age group 45–64 years and approximately 25 percent were in the group 65 years and over.

TABLE 8.—*Percentage distribution by age of reported cases of cancer by primary site, females only, San Francisco and Alameda Counties, Calif., 1938*

Primary site	Percent of cases of each site in each age group									Number of cases of known age
	Under 15	15–24	25–34	35–44	45–54	55–64	65–74	75 and over	All ages	
Buccal cavity	------	2.6	3.5	7.9	22.8	25.4	19.3	18.4	100.0	114
Digestive tract	------	.8	2.7	7.7	19.7	27.9	24.9	16.2	100.0	770
Stomach, duodenum	------	1.5	2.5	4.5	23.7	22.2	24.2	21.2	100.0	198
Intestines	------	.4	2.9	8.8	18.1	29.8	23.5	16.4	100.0	238
Rectum, anus	------	------	3.4	9.3	21.6	32.4	23.5	9.8	100.0	204
Others	------	1.5	1.5	7.7	18.8	26.2	30.8	18.5	100.0	130
Respiratory system	4.0	------	6.0	6.0	16.0	22.0	22.0	24.0	100.0	50
Uterus	------	.2	5.0	16.2	29.3	27.1	16.5	5.8	100.0	988
Other genital sites	.4	1.9	4.8	13.8	34.9	21.9	19.3	3.0	100.0	269
Urinary system	3.8	1.0	1.0	3.8	13.3	21.0	37.1	19.0	100.0	105
Breast	------	.1	3.3	12.3	28.1	28.9	17.6	9.7	100.0	1,258
Skin	.5	.5	2.9	6.3	14.3	19.3	33.1	23.0	100.0	378
Brain	8.6	20.0	22.9	20.0	20.0	8.6	------	------	100.0	35
Bones	12.5	10.4	4.2	4.2	14.6	22.9	25.0	6.3	100.0	48
All other sites	2.0	3.9	8.8	8.8	20.0	27.8	21.5	7.3	100.0	205
All sites	.5	.9	4.1	11.3	24.8	26.3	20.9	11.1	100.0	4,220

The data collected in this survey make it possible to compute crude prevalence rates by primary site and sex. Prevalence rates are based on all cases existing in the resident population during a given period of time, regardless of the date of onset (or first diagnosis). Hence, all cases, whether diagnosed, treated, or observed for cancer during 1938, are included in the computation of these rates for San Francisco-Alameda.

TABLE 9.—*Percentage distribution by primary site of all reported cancer cases, with the prevalence rates per 100,000 for resident cases, by sex, San Francisco and Alameda Counties, Calif., 1938*

Primary site	Percent of cases of each sex		Prevalence rates per 100,000 for resident cases	
	Male	Female	Male	Female
Buccal cavity	14.0	2.8	54.9	17.0
Lip	8.0	.8	31.6	5.1
Tongue	1.8	.5	6.8	3.5
Mouth	.7	.2	3.6	1.3
Jaw	.5	.2	2.1	.9
Pharynx	.6	.1	2.4	.4
Others	2.4	1.0	8.4	5.9
Digestive tract	31.6	17.8	135.2	114.6
Esophagus	1.8	.3	8.0	2.4
Stomach and duodenum	11.7	4.6	52.0	32.0
Intestines	6.2	5.5	28.0	34.4
Rectum and anus	8.1	4.7	29.9	26.4
Liver and biliary passages	1.5	1.3	7.2	9.5
Pancreas	1.9	1.0	8.5	7.3
Others	.4	.4	1.5	2.6

TABLE 9.—*Percentage distribution by primary site of all reported cancer cases, with the prevalence rates per 100,000 for resident cases, by sex, San Francisco, and Alameda Counties, Calif., 1938*—Continued

Primary site	Percent of cases of each sex		Prevalence rates per 100,000 for resident cases	
	Male	Female	Male	Female
Respiratory system	7.3	1.2	30.4	7.7
Larynx	2.4	.1	8.5	.5
Lungs and pleura	4.2	.9	19.0	5.7
Others	.7	.2	2.9	1.5
Prostate	9.0		39.0	
Uterus		22.3		129.6
Other genital system	2.0	6.4	8.9	39.0
Urinary system	6.4	2.5	26.5	15.0
Breast	.3	29.5	1.5	181.5
Skin	20.6	10.2	87.0	67.0
Brain	1.7	.8	4.6	8.5
Bones	1.5	1.2	6.5	7.1
All other sites	5.6	4.8	21.9	28.9
All sites	100.0	100.0	416.4	611.0

In this area, there were 416 cancer cases per 100,000 males, and 611 per 100,000 females. Malignancies of the digestive tract, the most common site of cancer among males, were reported for 135 per 100,000 males. The next most frequent sites for males, skin and buccal cavity, showed case rates of 87 and 55 per 100,000, respectively. Among females, the highest rates reported were for cancer of the breast, 181, uterus, 130, and digestive tract, 115. The case rate of skin cancer was also quite high among females, 67 per 100,000.

Since the prevalence rates were computed on the basis of all cases, including those which had not received any treatment during the study year, it is important to determine the extent to which differences among prevalence rates for the various sites might be due to differences in the reporting of cases under observation only during the study year in this area. Of the 5,773 resident cases of cancer reported as treated or observed during 1938, 1,133 were under observation only and had received no treatment during that year. In other words, in almost 20 percent of the cancer cases, the disease was arrested prior to 1938.[5] However, sharp differences were revealed among the primary sites in the proportions of cases that were under observation only. Almost 33 percent of the lip cases, 30 percent of the uterus cases, 26 percent of the skin cases and 26 percent of the breast cases had received no treatment and were under observation only during the study year. In contrast to this, for cancers of the digestive tract, respiratory system, prostate, and brain the proportions of cases under observation only were negligible. These proportions for the various

[5] This is a fairly high proportion, exceeded only by Atlanta and Detroit among the surveyed areas. In these areas the percentages were 26.6 and 20.6, respectively. The percentages were lowest for Chicago and New Orleans, 5.8 and 5.4, respectively.

sites may be considered as rough measures of relative fatality; the higher the proportion of observed (presumably arrested) cases, the lower the fatality.[6]

TABLE 10.—*Number and percentage distribution of resident cases of cancer under observation only during 1938, and percentages such cases were of all resident cases reported,[1] by primary site, San Francisco and Alameda Counties, Calif., 1938*

Primary site	Number of cases	Percentage distribution	Percentage that cases under-observation-only were of all cancer cases
Buccal cavity	97	8.6	23.4
Lip	70	6.2	32.9
Others	27	2.4	13.4
Digestive tract	155	13.7	10.9
Stomach and duodenum	44	3.9	9.2
Intestines	48	4.2	13.6
Rectum, anus	52	4.6	16.3
Others	11	1.0	4.1
Respiratory system	15	1.3	6.8
Lungs, pleura	5	.4	3.5
Others	10	.9	12.8
Prostate	16	1.4	7.0
Uterus	215	19.0	30.4
Other genital sites	68	6.0	25.7
Urinary system	20	1.8	8.4
Breast	258	22.8	25.8
Skin	228	20.1	26.1
Brain	5	.4	10.9
Bones	17	1.5	22.1
All other sites	39	3.4	13.6
All sites	1,133	100.0	19.6

[1] Resident cases by site are presented in table 9 of the appendix.

As was found in previous studies, many more female than male cases were under observation in San Francisco-Alameda. Of the 1,629 cases reported as under observation only during 1938 (resident and nonresident), 1,117, or 69 percent, were female.

Incidence rates for San Francisco-Alameda (table 11) relate only to cases reported as first diagnosed during 1938, i. e., cases which originated during the study year. They exclude all others, even though they may have received treatment during this period. The influence of the cases under observation only is, of course, eliminated in these rates, as is the influence of all cases which originated prior to and were carried over into the study year.

Among cases first diagnosed during the study year, as among the total resident cases reported (table 9), the highest rates among males were for the digestive tract (93 per 100,000), the skin (47 per 100,000), and the buccal cavity (29 per 100,000). Among females, however,

[6] This does not hold true for skin cancers which are not followed up as carefully as are cancers of other sites. Were all cured skin cancers followed up and reported, the percentage of skin cancers under observation only would be much larger.

TABLE 11.—*Percentage distribution by primary site of all reported cancer cases first seen in 1938, with the incidence rates per 100,000 for resident cases, by sex, San Francisco and Alameda Counties, Calif., 1938*

Primary site	Percentage distribution		Incidence rates per 100,000 for resident cases	
	Male	Female	Male	Female
Buccal cavity	12.9	3.4	28.5	9.7
Lip	6.8	1.4	14.7	3.8
Tongue	1.6	.3	3.8	1.1
Mouth	.6	.2	1.7	.5
Jaw	.5	.1	1.4	.2
Pharynx	.9	.1	2.1	.4
Others	2.6	1.2	5.0	3.7
Digestive tract	34.1	21.9	93.0	73.4
Esophagus	2.3	.5	5.8	1.8
Stomach and duodenum	12.5	6.4	34.9	22.7
Intestines	6.6	6.1	19.3	21.1
Rectum and anus	7.7	4.7	18.5	12.3
Liver and biliary passages	2.2	2.0	6.7	7.3
Pancreas	2.4	1.7	6.5	6.4
Others	.5	.5	1.4	1.8
Respiratory system	8.2	1.4	21.9	5.1
Larynx	2.0		4.4	.2
Lungs and pleura	5.4	1.2	15.6	4.2
Others	.8	.2	1.9	.7
Prostate	9.2		24.4	
Uterus		19.7		57.5
Other genital system	1.8	6.4	4.6	20.9
Urinary system	6.4	3.0	15.7	10.1
Breast	.1	24.4	.3	76.2
Skin	18.5	11.8	46.5	37.4
Brain	2.1	1.2	3.2	2.7
Bones	1.2	1.4	3.1	4.2
All other sites	5.5	5.4	13.7	16.7
All sites	100.0	100.0	255.1	313.8

the order of the primary sites is not the same for the two types of rates. Cancer of the breast, the uterus and the digestive tract, in the order named, showed the highest prevalence rates. The highest incidence rates were for the breast (76 per 100,000), the digestive tract (73 per 100,000), and the uterus (58 per 100,000). This finding is consistent with the fact that cancer of the digestive tract is far more fatal than that of the uterus. If an equal number of cases of these two sites were to arise in a given year, producing identical incidence rates, the prevalence rate of cancer of the uterus in the ensuing year would be much higher than that of cancer of the digestive tract, since a much larger proportion of the cases of the uterus would have survived.

In order to determine what proportion of the cancer prevalence of the various sites was composed of cases first seen during the study year, the ratio of the new cases to the total resident cases was computed. Obviously, this ratio also indicates the proportion of the cases receiving medical care or observation which had been carried over into the study year from previous years.

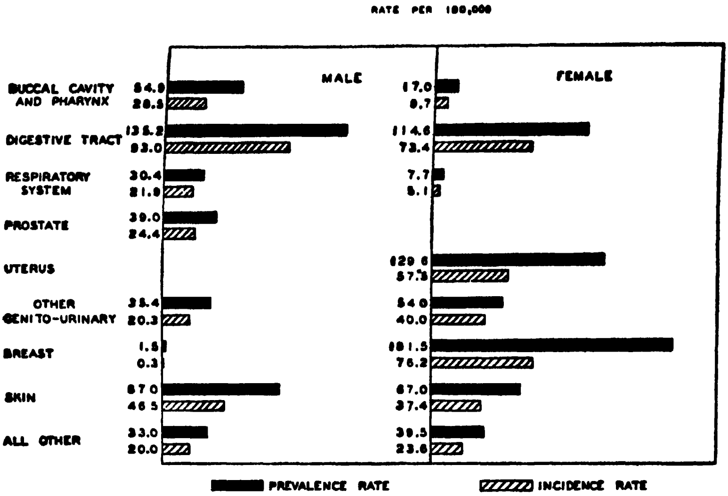

FIGURE 2.—Cancer prevalence and incidence rates per 100,000 residents, by sex, San Francisco and Alameda Counties, Calif., 1938.

TABLE 12.—*Percentages that cases first seen in 1938 were of all cancer cases,*[1] *by primary site and sex, resident cases only, San Francisco and Alameda Counties, Calif., 1938*

Primary site	Percent		Primary site	Percent	
	Male	Female		Male	Female
Buccal cavity	52.0	57.0	Prostate	62.7	
Lip	46.5	75.0	Uterus		44.4
Others	59.6	49.2	Other genital sites	51.9	53.5
Digestive tract	68.8	64.1	Urinary system	59.4	67.1
Stomach and duodenum	67.1	70.9	Breast	22.2	42.0
Intestines	68.9	61.2	Skin	53.4	55.7
Rectum, anus	61.7	46.5	Brain	70.4	78.9
Others	80.4	79.8	Bones	47.4	59.0
Respiratory system	71.9	66.7	All other sites	62.5	57.6
Lungs and pleura	82.0	74.2			
Others	55.2	45.5	All sites	61.2	51.4

[1] The actual numbers of cases are presented in tables 9 and 11 of the appendix.

Of the 5,773 resident cases of cancer seen or treated in San Francisco-Alameda during 1938, 3,206, or 55.5 percent, were first diagnosed in the study year. Sixty-one percent of the total male cases originated during the study year, as against only 51 percent of the female cases. In this connection, it will be recalled that there were many more females under observation only during 1938 than males.

It is apparent from table 12 that, for the primary sites less susceptible to successful treatment, the cases reported were largely new ones. Among males, 72 percent of the respiratory system cases, 69 percent of the digestive tract cases, and 63 percent of the prostate cases were first diagnosed during the study year, as compared with 52 percent of the buccal cavity cases and 53 percent of the skin cases first diagnosed during that period. Among females, 64 percent of digestive

tract cancers were new, while only 44 and 42 percent of the cases of the uterus and breast were first seen during 1938.

In general, the survival period of cancer patients is extremely short. This conclusion is borne out by the data in tables 13 and 15. Thirty-nine percent of all cancer cases reported in San Francisco-Alameda had durations of under 6 months from the date of first diagnosis to death or the end of the study year (table 13), and over 60 percent of them had durations of under a year. Of course, there proportions are made up not only of patients who were alive at the end of the study year, but of patients who died before that date. Considered separately, the durations of cases alive at the end of the year were much longer than those of the dead cases; 31 percent of the living cases had durations of less than 6 months since first diagnosis, while 57 percent of the dead cases did not survive that period; 56 percent of the living cases had durations of less than a year, while 73 percent of the deceased patients had died before the passage of a year.

TABLE 13.—*Number and percentage of cases of cancer by the number of months since first diagnosis, and vital condition, San Francisco and Alameda Counties, Calif., 1938*

Number of months since diagnosis	Percentage			Number		
	All cases	Cases alive at end of year	Cases dead at end of year	All cases	Cases alive at end of year[1]	Cases dead at end of year
Under 6	38.5	31.4	57.0	3,021	1,789	1,232
6-11	21.9	24.2	15.8	1,723	1,382	341
12-17	9.4	10.0	7.8	741	572	169
18-23	6.2	6.6	5.2	488	376	112
24-29	4.5	4.8	3.6	353	276	77
30-35	3.5	3.9	2.3	274	224	50
36-41	2.5	2.8	1.7	194	157	37
42-47	2.0	2.4	1.2	161	136	25
48-53	1.7	2.0	.7	131	116	15
54-59	1.3	1.5	1.0	104	83	21
60 and over	8.3	10.3	3.0	650	585	65
Unknown	.2	.1	.7	19	3	16
Total	100.0	100.0	100.0	7,859	5,699	2,160

[1] Includes 234 cases of unknown vital condition

Although the dead cases, to a much greater extent than the living, consisted of cancer of sites more difficult to treat, as indicated in table 14, another factor in addition to that of primary site should be taken into account in seeking an explanation of the difference in duration of living and dead cases. It is evident that even among cancer cases of the digestive tract and respiratory system the duration of the dead cases was much shorter than that of the living cases (table 15). It thus appears that not only the primary site of the cancer, but the stage of development of the cancer before diagnosis is made and treatment begun is also an important factor in determining the chances of survival of the patient.

TABLE 14.—*Percentage distribution by primary site of reported cancer cases,[1] classified by vital condition at end of year, San Francisco-Alameda Counties, Calif., 1938*

Vital condition at end of study year	Buccal cavity	Digestive tract	Respiratory system	Genito-urinary system	Breast	Skin	All others	All cases
Living	9.2	16.8	2.7	25.6	19.7	19.0	7.0	100.0
Dead	3.6	42.2	6.9	25.3	10.3	2.5	9.2	100.0

[1] Cases of unknown vital status are excluded.

TABLE 15.—*Percentage of cases of cancer with duration of less than certain specified number of months since diagnosis, classified by primary site and vital condition at the end of the year, San Francisco and Alameda Counties, Calif., 1938*

Duration in months since diagnosis	Buccal cavity		Digestive tract		Respiratory system		Genito-urinary system		Breast		Skin		All others	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
Less than 6 months	35	39	39	67	39	68	29	51	22	31	31	26	33	63
Less than 12 months	63	55	63	82	66	85	51	67	43	45	57	52	58	78
Less than 18 months	73	74	74	89	77	93	62	76	52	56	68	56	67	84
Less than 24 months	79	84	81	92	81	97	69	83	60	63	74	67	75	88
Less than 30 months	82	88	83	94	86	97	75	87	66	71	80	81	79	92
Less than 36 months	86	92	87	96	88	97	79	90	72	77	83	87	83	93
Less than 42 months	88	92	89	96	89	98	82	93	75	81	86	89	85	95
Less than 48 months	89	94	90	97	91	98	84	94	80	84	88	89	87	95
Less than 54 months	90	96	92	97	94	98	86	95	83	86	90	91	88	95
Less than 60 months	91	97	93	98	95	98	89	96	84	88	91	93	89	96

SUMMARY

The number of cases of cancer under medical care in San Francisco and Alameda Counties, Calif., in 1938, was 7,859, of which 5,773 were residents and 2,086 were nonresidents. There were 1,974 cancer deaths recorded, of which 173 were resident cases not reported by doctors or hospitals. These, added to the reported cases, make the total resident cases 5,946.

The prevalence rate was 525.7 per 100,000 residents. To a certain extent the high prevalence rate in this area is attributable to the unusually old population.

The most frequent primary sites of cancer reported among males were the digestive tract, skin, and buccal cavity, and among females, the breast, uterus, and digestive tract.

Since the various primary sites cannot be treated with equal success, the frequency of occurrence of specific sites among the living cases was not the same as among dead cases. Cancers of the digestive tract and respiratory system were far more frequent among the dead than the living cases, while skin and breast cancers were far more frequent among the living cases.

The frequency of occurrence of cancer of certain organs varies with age. Brain and bone cancers were especially likely to develop at an

early age, while in nearly 3 out of 4 of the prostate cases the patient was 65 years of age or over.

There were 416 cancer cases per 100,000 males and 611 per 100,000 females. The incidence rates, relating only to those cases first seen in the study year, were 255 per 100,000 males and 314 per 100,000 females.

Thirty-nine percent of all cancer cases reported had durations of under 6 months from the date of first diagnosis to death or the end of the study year, and over 60 percent of them had durations of under a year. The durations of the cases reported as alive were longer than those of the dead; 56 percent of the living cases had durations of under a year, while 73 percent of the dead patients had died before passage of a year.

Appendix

The appendix tables, which present the absolute numbers of cases, are numbered to correspond with the tables in the text which are based upon them.

TABLE 1.—*Number of cases of cancer reported, by reporting source, and by number of sources, by sex and color, San Francisco and Alameda Counties, Calif., 1938*

Nature and number of reporting sources	Number of cancer cases reported						
	White		Colored		Total		All cases
	Males	Females	Males	Females	Males	Females	
Doctor(s) only	1,056	1,647	19	12	1,075	1,659	2,734
Hospital(s) only	1,868	2,083	58	32	1,926	2,115	4,041
Doctor(s) and hospital(s)	424	644	9	7	433	651	1,084
All sources	3,348	4,374	86	51	3,434	4,425	7,859
One source only	2,711	3,482	70	44	2,781	3,526	6,307
Two sources only	493	694	14	6	507	700	1,207
Three or more sources	144	198	2	1	146	199	345
All sources	3,348	4,374	86	51	3,434	4,425	7,859

TABLE 4.—*Number of cases of cancer reported, and the number with diagnosis microscopically confirmed, by primary site and reporting source, San Francisco and Alameda Counties, Calif., 1938*

Primary site	Number of cases reported					
	By doctors only		By a hospital [1]		By all sources	
	With a biopsy [2]	Total	With a biopsy [2]	Total	With a biopsy [2]	Total
Buccal cavity	149	240	295	365	444	605
Digestive tract	257	547	882	1,324	1,139	1,871
Respiratory system	40	75	163	227	203	302
Uterus	170	239	696	773	866	1,012
Prostate	45	83	156	225	201	308
Other genital system	94	110	208	240	302	350
Urinary system	67	97	195	232	262	329
Breast	402	529	663	789	1,065	1,318
Skin	326	648	382	517	708	1,160
Brain	4	11	63	83	67	94
Bones	19	36	46	68	65	104
All other sites	81	125	213	281	294	406
All sites	1,654	2,735	3,962	5,124	5,616	7,859

[1] This group includes cases reported by both a doctor and a hospital.

[2] Biopsy is used here to denote any microscopic confirmation of diagnosis (i. e., biopsy or necropsy). A biopsy that did not show malignancy was not recorded as a biopsy.

TABLE 5.—*Number of reported cases and recorded deaths from cancer, by primary site and sex, among residents, San Francisco and Alameda Counties, Calif., 1938*

Primary site	Cases		Deaths	
	Male	Female	Male	Female
Buccal cavity	321	93	40	11
Lip	185	28	4	----------
Tongue	40	19	11	6
Mouth	21	7	4	1
Jaw	12	5	5	2
Pharynx	14	2	7	1
Others	49	32	9	1
Digestive tract	791	626	482	318
Esophagus	47	13	30	8
Stomach and duodenum	304	175	208	111
Intestines	164	188	84	78
Rectum and anus	175	144	70	88
Liver and biliary passage	42	52	44	44
Pancreas	50	40	39	30
Others	9	14	7	9
Respiratory system	178	42	98	24
Larynx	50	3	19	2
Lungs and pleura	73	27	49	19
Others	55	12	30	3
Prostate	228	----------	91	----------
Uterus	----------	708	----------	163
Other genital system	52	213	6	67
Urinary system	155	82	55	24
Breast	9	991	1	160
Skin	509	366	13	7
Brain	27	19	6	3
Bones	38	39	10	8
All other sites	128	158	56	76
All sites	2,436	3,337	858	861

TABLE 6.—*Number of reported cases of cancer by age of patient, for all cases by sex and color, and for resident cases by sex, San Francisco and Alameda Counties, Calif., 1938*

Age group	Number of reported cases of cancer							
	Resident cases		All cases, by color				All cases	
			White		Colored [1]			
	Male	Female	Male	Female	Male	Female	Male	Female
Under 5	4	3	6	6	----------	----------	6	6
5-9	----------	1	3	3	----------	----------	3	3
10-14	8	6	15	13	----------	----------	15	13
15-19	9	11	17	14	2	----------	19	14
20-24	19	18	29	24	2	2	31	26
25-29	31	36	41	52	5	1	46	53
30-34	37	81	58	118	1	1	59	119
35-39	60	128	93	187	2	4	95	191
40-44	97	200	140	285	4	2	144	287
45-49	122	367	200	487	6	8	206	495
50-54	242	419	362	538	13	12	375	550
55-59	344	390	455	538	18	7	473	545
60-64	338	421	457	560	16	6	473	566
65-69	351	384	486	501	12	4	498	505
70-74	278	307	363	373	2	4	365	377
75-79	218	241	262	286	2	----------	264	286
80-84	93	108	111	119	----------	----------	111	119
85-89	42	43	49	49	----------	----------	49	49
90-94	4	13	5	14	----------	----------	5	14
95 and over	2	2	3	2	----------	----------	3	2
Unknown	142	163	193	205	1	----------	194	205
All ages [1]	2,436	3,337	3,348	4,374	86	51	3,434	4,425

[1] All residents except 12 males and 5 females.

TABLE 7.—*Number of male cases of cancer reported, by primary site and age of patient, San Francisco and Alameda Counties, Calif., 1938*

Primary site	Age of patient									
	Under 15	15–24	25–34	35–44	45–54	55–64	65–74	75 and over	Unknown	All ages
Buccal cavity	1	2	15	47	95	132	113	41	35	481
Lip	------	------	9	31	61	64	56	24	28	273
Others	1	2	6	16	34	68	57	17	7	208
Digestive tract	2	3	20	74	189	355	300	120	21	1,084
Stomach, duodenum	------	------	9	35	67	129	115	41	7	403
Intestines	1	1	6	12	33	68	55	28	7	211
Rectum, anus	------	1	4	16	54	91	82	27	4	279
Others	1	1	1	11	35	67	48	24	3	191
Respiratory system	2	4	6	19	60	85	54	9	12	251
Lungs, pleura	1	3	2	15	35	51	29	5	4	145
Others	1	1	4	4	25	34	25	4	8	106
Prostate	------	------	1	2	15	67	116	100	7	308
Other genital sites	1	6	15	12	5	11	12	4	2	68
Urinary system	------	3	6	9	44	63	59	29	7	220
Skin	1	9	13	38	103	160	177	107	98	706
Brain	7	5	9	9	19	7	1	------	2	59
Bones	2	9	7	5	9	8	7	6	------	53
All other sites	8	9	13	24	42	58	24	16	10	204
All sites	24	50	105	239	581	946	863	432	194	3,434

TABLE 8.—*Number of female cases of cancer reported, by primary site and age of patient, San Francisco and Alameda Counties, Calif., 1938*

Primary site	Age of patient									
	Under 15	15–24	25–34	35–44	45–54	55–64	65–74	75 and over	Unknown	All ages
Buccal cavity	------	3	4	9	26	29	22	21	10	124
Lip	------	------	------	2	7	5	7	7	10	38
Others	------	3	4	7	19	24	15	14	------	86
Digestive tract	------	6	21	59	152	215	192	125	17	787
Stomach, duodenum	------	3	5	9	47	44	48	42	5	203
Intestines	------	1	7	21	43	71	56	39	7	245
Rectum, anus	------	------	7	19	44	66	48	20	3	207
Others	------	2	2	10	18	34	40	24	2	132
Respiratory system	2	------	3	3	8	11	11	12	1	51
Lungs, pleura	2	------	2	------	6	9	10	8	1	38
Others	------	------	1	3	2	2	1	4	------	13
Uterus	------	2	49	160	289	268	163	57	24	1,012
Other genital sites	1	5	13	37	94	59	52	8	13	282
Urinary system	4	1	1	4	14	22	39	20	4	109
Breast	------	1	42	155	353	363	222	122	49	1,307
Skin	2	2	11	24	54	73	125	87	76	454
Brain	3	7	8	7	7	3	------	------	------	35
Bones	6	5	2	2	7	11	12	3	3	51
All other sites	4	8	18	18	41	57	44	15	8	213
All sites	22	40	172	478	1,045	1,111	882	470	205	4,425

TABLE 9.—*Number of cancer cases reported, by primary site and sex, with the number of resident cases, by color, San Francisco and Alameda Counties, Calif., 1938*

Primary site	Number of cases					
	Resident cases				Total	
	White		Colored			
	Male	Female	Male	Female	Male	Female
Buccal cavity	313	91	8	2	481	124
Lip	182	28	3	....	278	38
Tongue	40	19	....	....	62	22
Mouth	21	7	....	....	24	9
Jaw	12	4	....	1	17	7
Pharynx	12	2	2	....	21	3
Others	46	31	3	1	84	45
Digestive tract	753	618	38	8	1,084	787
Esophagus	46	13	1	....	63	13
Stomach, duodenum	288	172	16	3	403	203
Intestines	156	187	8	1	211	245
Rectum, anus	169	142	6	2	279	207
Liver, biliary passage	38	50	4	2	52	57
Pancreas	48	40	2	....	63	44
Others	8	14	1	....	13	18
Respiratory system	166	42	12	....	251	51
Larynx	50	3	....	....	81	4
Lungs, pleura	106	31	5	....	145	38
Others	10	8	7	....	25	9
Prostate	227	....	1	....	308	....
Uterus	....	693	....	15	....	1,012
Other genital system	51	209	1	4	68	282
Urinary system	150	81	5	1	220	109
Breast	9	979	....	12	11	1,307
Skin	509	366	....	....	706	454
Brain	26	19	1	....	59	35
Bones	37	39	1	....	53	51
All other sites	121	154	7	4	193	213
All sites	2,362	3,291	74	46	3,434	4,425

TABLE 11.—*Total and resident cases of cancer first seen in 1938, by primary site and sex, San Francisco and Alameda Counties, Calif., 1938*

Primary site	Total cases reported		Resident cases	
	Male	Female	Male	Female
Buccal cavity	280	75	167	53
Lip	148	31	86	21
Tongue	34	7	22	6
Mouth	12	5	10	3
Jaw	11	3	8	1
Pharynx	19	3	12	2
Others	56	26	29	20
Digestive tract	738	486	544	401
Esophagus	49	10	34	10
Stomach and duodenum	270	143	204	124
Intestines	144	135	113	115
Rectum and anus	167	104	108	67
Liver and biliary passages	47	45	39	40
Pancreas	51	38	38	35
Others	10	11	8	10
Respiratory system	178	32	128	28
Larynx	43	1	26	1
Lungs and pleura	117	26	91	23
Others	18	5	11	4
Prostate	199	----	143	------
Uterus		437		314
Other genital system	40	142	27	114
Urinary system	139	67	92	55
Breast	3	541	2	416
Skin	400	263	272	204
Brain	45	27	19	15
Bones	27	31	18	23
All other sites	119	120	80	91
All sites	2,168	2 221	1 492	1,714

TABLE 15.—*Number of cases of cancer with duration of less than certain specified number of months since diagnosis, classified by primary site and vital condition at the end of the year, San Francisco and Alameda Counties, Calif., 1938*

Duration in months since diagnosis	Buccal cavity		Digestive tract		Respiratory tract		Genito urinary system		Breast		Skin		All others	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
Less than 6 months	174	30	356	614	58	102	398	277	236	69	324	14	126	126
Less than 12 months	318	42	596	752	99	127	713	369	463	99	596	28	224	156
Less than 18 months	367	57	678	811	115	138	865	415	560	124	706	30	257	167
Less than 24 months	397	65	730	837	122	144	957	456	645	140	770	36	267	176
Less than 30 months	418	66	764	857	130	144	1,046	477	707	157	827	44	304	184
Less than 36 months	432	71	796	872	133	145	1,101	490	772	171	859	47	318	185
Less than 42 months	442	71	818	878	134	146	1,140	506	812	180	898	48	327	189
Less than 48 months	448	72	834	886	137	146	1,176	516	858	186	915	48	335	189
Less than 54 months	455	74	841	890	141	146	1,202	519	891	191	935	49	339	190
Less than 60 months	458	75	852	895	143	146	1,236	526	906	195	948	50	342	192
All durations [1]	503	77	917	912	150	149	1,396	547	1,077	222	1,088	54	384	199

[1] Contains 18 cases of unknown duration

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DEATHS DURING WEEK ENDED OCTOBER 3, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 3, 1942	Corresponding week 1941
Data from 88 large cities of the United States:		
Total deaths	8,226	7,687
Average for 3 prior years	7,608	
Total deaths, first 39 weeks of year	324,711	[illegible],118
Deaths per 1,000 population, first 39 weeks of year, annual rate	11.6	11.7
Deaths under 1 year of age	637	537
Average for 3 prior years	499	
Deaths under 1 year of age, first 39 weeks of year	22,204	20,409
Data from industrial insurance companies.		
Policies in force	65,065,862	64,506,975
Number of death claims	11,029	11,001
Death claims per 1,000 policies in force, annual rate	8.8	8.9
Death claims per 1,000 policies, first 39 weeks of year, annual rate	9.2	9.6

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED OCTOBER 10, 1942

Summary

Of the 9 common communicable diseases for which comparable weekly reports for prior years are available, usual seasonal increases were recorded for 6 (diphtheria, influenza, measles, meningococcus meningitis, scarlet fever, and smallpox), while decreases were reported for 3 (poliomyelitis, typhoid fever, and whooping cough). Possibly with the exception of meningococcus meningitis, the current incidence of none of these diseases is significantly high.

A total of 62 cases of meningococcus meningitis was reported during the week, as compared with 48 cases for the preceding week and a 5-year (1937–41) median of 27 cases. During most of the current year the incidence has been consistently above that for the corresponding week of any prior year since 1937. The total number of cases reported to date this year, however, is only 2,733, as compared with 4,548 cases for the same period in 1937. Currently the highest incidence is reported in the Pacific, South Atlantic, New England, and Middle Atlantic States.

The number of cases of poliomyelitis declined from 217 to 189, of which slightly more than one-half (95) were reported in the Middle Atlantic and East North Central States. Of 1,098 cases of influenza, 760 were reported in 3 States—Texas (458), South Carolina (195), and Virginia (107).

Of 550 cases of diphtheria, 245 occurred in the South Atlantic States. That area and the South Central areas apparently have the highest incidence. However, the total number of cases to date this year (9,924) is below that for the corresponding period of any prior year of record.

Other diseases reported during the week include 4 cases of anthrax (1 each in New Jersey, Pennsylvania, Missouri, and California), 16 cases of infectious encephalitis, 1 case of leprosy (in Louisiana),

4 cases of Rocky Mountain spotted fever (all in the eastern States), 4 cases of smallpox, 9 cases of tularemia, and 93 cases of endemic typhus fever (32 in Georgia and 29 in Texas).

A sharp increase was recorded in the death rate for 88 large cities in the United States, which was 12.2 per 1,000 population, as compared with 11.5 last week, 10.7 for the next earlier week, and a 3-year (1939–41) average of 10.8. Last year the death rate for this group of large cities did not reach 12.2 until the latter part of December.

Telegraphic morbidity reports from State health officers for the week ended October 10, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Oct 10, 1942	Oct 11, 1941		Oct 10, 1942	Oct 11, 1941		Oct 10, 1942	Oct 11, 1941		Oct 10, 1942	Oct 11, 1941	
NEW ENG												
Maine	0	0	1	----	-	-----	6	50	8	0	0	0
New Hampshire	1	0	0	----	----	-----	3	1	1	0	0	0
Vermont	0	0	0	----	---	-----	20	0	5	0	0	0
Massachusetts	3	2	2	---	- -		53	57	54	1	3	1
Rhode Island	3	1	0	---			7	5	4	1	0	0
Connecticut	0	0	2	3	6	1	10	24	3	2	0	0
MID ATL												
New York	9	17	12	[1] 15	[1] 3	[1] 7	76	76	65	16	3	3
New Jersey	1	2	7	7	12	8	29	24	24	0	0	0
Pennsylvania	6	12	18	4	1		60	86	86	4	2	1
E NO. CEN												
Ohio	18	11	25	4	6	4	18	23	19	2	0	1
Indiana	6	11	14	20	6	4	4	5	5	0	1	0
Illinois	10	20	20	4	8	8	18	13	18	5	1	1
Michigan [2]	8	7	10	10	-	1	24	57	54	2	1	2
Wisconsin	0	0	1	11	19	19	39	40	40	0	0	0
W NO CEN												
Minnesota	2	3	4		2	1	4	3	3	1	0	0
Iowa	5	2	4	7		-	5	8	8	0	0	0
Missouri	4	7	7	4	1	2	11	14	3	0	0	0
North Dakota	3	2	2	8	7	1	11	18	4	0	0	0
South Dakota	3	12	2				3	2	2	3	1	0
Nebraska	2	2	2	2			11	2	2	0	0	0
Kansas	6	2	4	3	1	3	7	4	4	0	0	1
SO ATL												
Delaware	1	1	1	- -			0	2	2	0	0	0
Maryland [2]	11	7	7	2	3	3	4	10	5	5	2	1
Dist. of Col	3	2	3	-	2		2	7	2	0	0	0
Virginia	39	37	64	107	114	45	11	24	9	4	1	2
West Virginia	10	5	16	6	11	8	1	49	5	1	0	0
North Carolina	90	59	99	2	-	1	5	34	31	2	1	1
South Carolina	48	50	20	195	200	168	7	76	2	0	3	0
Georgia	32	45	45	12	13	14	10	14	3	2	0	0
Florida	11	5	5		10	1	0	1	1	0	1	1
E SO CEN												
Kentucky	16	16	28	1	-	4	2	7	12	1	2	1
Tennessee	8	23	34	15	8	8	6	28	15	0	1	1
Alabama	25	28	32	15	10	13	8	25	9	0	0	0
Mississippi [2]	23	17	17		---	--	--- -	0		1	0	0
W SO CEN												
Arkansas	20	16	18	28	8	14	2	31	2	0	1	0
Louisiana	1	10	13	7	3	3	5	1	3	0	2	0
Oklahoma	10	14	16	31	44	38	3	7	5	0	0	0
Texas	61	43	43	458	361	170	15	11	11	0	0	0
MOUNTAIN												
Montana	2	2	1		------	2	6	11	12	1	0	0
Idaho	1	0	0	3	---	1	17	1	3	0	0	0
Wyoming	0	2	0	24	1	-	4	4	4	0	0	0
Colorado	18	9	9	31	50	11	8	18	10	0	0	0
New Mexico	0	0	3		2		0	4	8	0	0	0
Arizona	1	0	1	38	47	46	3	35	2	0	0	0
Utah [2]	0	0	0	------	1	1	113	8	7	0	0	0
Nevada	0	0	------	-----	-------	-----	1	0	-- --	0	0	-----
PACIFIC												
Washington	5	0	0	1	-------	------	69	9	9	1	0	0
Oregon	3	1	1	3	7	8	49	9	9	1	1	0
California	21	12	16	17	28	16	56	101	77	6	0	0
Total	550	517	630	1,008	995	705	821	1,039	989	62	27	27
40 weeks	9,924	10,396	15,488	85,868	405,495	163,687	470,869	820,533	351,884	2,783	1,614	1,614

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended October 10, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41
	Oct. 10, 1942	Oct. 11, 1941		Oct. 10, 1942	Oct. 11, 1941		Oct. 10, 1942	Oct. 11, 1941		Oct. 10, 1942	Oct. 11, 1941	
NEW ENG.												
Maine	0	4	0	3	10	9	0	0	0	0	3	3
New Hampshire	1	1	1	7	2	1	0	0	0	0	0	0
Vermont	5	0	1	5	1	7	0	0	0	0	0	0
Massachusetts	1	13	6	112	92	57	0	0	0	3	5	2
Rhode Island	0	2	0	9	7	3	0	0	0	0	0	0
Connecticut	2	5	1	23	18	18	0	0	0	4	1	3
MID. ATL.												
New York	20	79	43	133	90	104	0	0	0	10	16	17
New Jersey	13	25	9	44	39	38	0	0	0	3	7	7
Pennsylvania	10	42	18	102	94	120	0	0	0	13	13	15
E. NO. CEN.												
Ohio	4	21	12	122	100	126	0	0	0	6	12	16
Indiana	1	2	4	39	32	57	0	0	2	3	3	3
Illinois	35	25	25	103	75	159	0	0	0	16	8	17
Michigan [2]	5	31	31	61	74	114	0	1	0	3	5	6
Wisconsin	7	5	10	99	68	69	0	0	0	2	0	2
W. NO. CEN.												
Minnesota	2	19	19	40	43	53	0	0	0	0	0	1
Iowa	3	0	14	26	33	38	0	0	0	2	3	4
Missouri	7	2	2	36	25	41	0	2	0	9	11	11
North Dakota	2	1	0	4	18	12	0	0	0	0	0	1
South Dakota	0	1	1	21	13	12	1	0	0	0	[illegible]	1
Nebraska	5	0	1	7	16	5	0	0	0	0	1	1
Kansas	4	6	6	55	37	76	0	0	0	0	2	2
SO. ATL.												
Delaware	1	5	0	7	8	6	0	0	0	0	2	0
Maryland [2]	0	9	2	31	25	25	0	0	0	4	9	9
Dist. of Col.	1	3	1	14	11	8	0	0	0	1	0	1
Virginia	1	11	2	50	39	34	0	0	0	6	62	14
West Virginia	2	5	4	62	38	46	0	0	0	6	10	7
North Carolina	11	8	3	110	57	72	0	0	0	4	5	6
South Carolina	3	8	1	8	13	11	0	0	0	3	3	5
Georgia	1	6	2	48	23	24	0	0	0	3	16	11
Florida	2	6	1	4	6	5	0	0	0	1	1	1
E. SO. CEN.												
Kentucky	2	8	6	26	58	53	1	0	0	10	17	17
Tennessee	3	16	3	67	42	42	1	0	0	5	12	12
Alabama	0	17	3	30	32	27	0	0	0	1	3	3
Mississippi [2]	2	6	2	15	17	17	0	0	0	3	4	4
W. SO. CEN.												
Arkansas	3	1	1	2	13	15	0	1	0	3	6	16
Louisiana	0	7	3	3	8	8	0	0	0	6	15	12
Oklahoma	0	2	4	23	13	28	0	1	1	2	4	15
Texas	7	5	5	35	29	32	0	0	0	9	------	23
MOUNTAIN												
Montana	0	0	0	6	8	11	0	0	1	0	0	1
Idaho	0	0	0	10	12	11	0	0	0	1	0	0
Wyoming	0	1	0	0	9	9	1	0	0	0	0	0
Colorado	3	0	2	21	5	15	0	0	2	1	4	4
New Mexico	2	0	0	4	8	6	0	0	0	9	3	7
Arizona	1	0	0	6	3	4	0	0	0	5	1	1
Utah [2]	5	2	2	10	8	8	0	0	0	2	0	1
Nevada	0	0	------	0	0	------	0	0	------	1	7	------
PACIFIC												
Washington	2	6	6	17	12	22	0	0	0	0	2	3
Oregon	0	5	1	15	3	18	0	0	1	0	0	1
California	10	8	10	47	84	89	0	0	3	3	5	7
Total	189	429	408	1,721	1,466	1,654	4	5	33	163	283	344
40 weeks	3,024	7,274	7,274	96,437	96,798	124,297	644	1,184	8,374	5,513	6,938	10,434

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 10, 1942—Continued

Division and State	Whooping cough: Week ended Oct. 10, 1942	Whooping cough: Week ended Oct. 11, 1941	Week ended October 10, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	45	4	0	0	0	0	0	0	0	0	0
New Hampshire	0	13	0	0	0	0	0	0	0	0	0
Vermont	35	12	0	0	0	0	0	0	0	0	0
Massachusetts	156	99	0	0	1	0	1	0	0	0	0
Rhode Island	24	19	0	0	0	0	0	0	0	0	0
Connecticut	54	37	0	0	0	0	0	0	0	0	0
MID. ATL.											
New York	295	297	0	4	28	0	2	0	0	0	0
New Jersey	115	89	1	26	0	0	0	0	0	0	0
Pennsylvania	199	239	1	0	0	0	0	0	1	0	0
E. NO. CEN.											
Ohio	125	176	0	0	0	0	0	0	0	0	0
Indiana	23	6	0	0	0	0	0	0	0	0	0
Illinois	195	176	0	0	10	0	2	0	1	1	0
Michigan [2]	210	134	0	2	7	0	0	0	0	0	0
Wisconsin	151	191	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	25	56	0	0	1	0	0	0	0	0	0
Iowa	17	31	0	0	0	0	0	0	0	0	0
Missouri	4	6	1	0	0	0	0	0	0	2	0
North Dakota	6	13	0	0	0	0	0	0	0	1	0
South Dakota	2	22	0	0	0	0	0	0	0	0	0
Nebraska	6	5	0	0	0	0	0	0	0	0	0
Kansas	16	29	0	0	0	0	2	0	0	0	0
SO. ATL.											
Delaware	0	3	0	0	0	0	0	0	0	0	0
Maryland [2]	75	36	0	0	0	12	0	0	1	0	0
Dist. of Col.	16	17	0	0	0	0	0	0	0	0	0
Virginia	8	29	0	0	0	71	0	0	1	0	1
West Virginia	14	30	0	0	0	0	0	0	0	0	0
North Carolina	58	69	0	0	0	0	0	0	0	0	3
South Carolina	21	60	0	0	9	0	0	0	0	0	5
Georgia	10	10	0	1	0	0	0	0	0	1	32
Florida	7	5	0	0	1	0	0	0	0	0	6
E. SO. CEN.											
Kentucky	9	91	0	0	10	0	0	0	0	0	0
Tennessee	18	49	0	1	0	6	1	0	0	1	1
Alabama	24	6	0	0	0	0	0	0	0	0	4
Mississippi [2]	------	0	0	0	0	0	0	0	0	0	2
W. SO. CEN.											
Arkansas	10	2	0	0	6	0	0	0	0	1	0
Louisiana	0	3	0	1	3	0	0	1	0	0	2
Oklahoma	4	4	0	0	0	0	0	0	0	0	0
Texas	94	52	0	7	98	0	1	0	0	0	29
MOUNTAIN											
Montana	37	8	0	0	0	0	1	0	0	0	0
Idaho	0	2	0	0	0	0	0	0	0	0	0
Wyoming	3	4	0	0	0	0	0	0	0	0	0
Colorado	30	40	0	0	0	0	0	0	0	0	0
New Mexico	3	24	0	0	4	0	0	0	0	0	0
Arizona	6	16	0	0	0	17	0	0	0	0	0
Utah [2]	14	28	0	0	0	0	0	0	0	0	0
Nevada	2	6	0	0	0	0	0	0	0	1	0
PACIFIC											
Washington	23	42	0	0	0	0	5	0	0	0	0
Oregon	7	45	0	1	0	0	0	0	0	0	1
California	154	197	1	2	11	0	1	0	0	1	2
Total	2,350	2,832	4	45	189	106	16	1	4	9	88
40 weeks	141,736	168,264	-----	-----	-----	-----	-----	-----	-----	-----	-----

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended September 26, 1942

This table lists the reports from 90 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	3	0	3	0	2	0	1	0	1	0	0	3
Baltimore, Md	0	0	2	0	1	9	11	2	9	0	0	52
Barre, Vt.	0	0	------	0	0	0	0	0	0	0	0	0
Billings, Mont	0	0	------	0	0	0	1	0	1	0	0	1
Birmingham, Ala	0	0	2	0	1	0	4	0	3	0	0	1
Boise, Idaho	0	0	------	1	1	0	0	0	0	0	0	0
Boston, Mass	1	0	------	0	5	1	15	0	19	0	6	41
Bridgeport, Conn	0	0	------	0	0	0	1	0	0	0	1	0
Brunswick, Ga	0	0	------	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	------	0	3	0	9	0	2	0	0	13
Camden, N. J	0	0	------	0	0	0	0	0	1	0	1	6
Charleston, S. C	0	0	5	0	0	0	2	2	0	0	0	3
Charleston, W. Va	0	0	1	0	0	0	0	0	1	0	0	0
Chicago, Ill	11	0	5	0	12	0	10	10	14	0	1	119
Cincinnati, Ohio	0	0	------	0	2	0	1	1	7	0	0	3
Cleveland, Ohio	5	0	1	0	2	0	6	3	18	0	0	44
Columbus, Ohio	0	0	------	0	1	0	1	0	2	0	0	10
Concord, N. H	0	0	------	0	0	0	0	0	0	0	0	0
Cumberland, Md	0	0	------	0	0	0	0	0	0	0	0	0
Dallas, Tex	3	0	------	0	2	0	4	0	3	0	0	5
Denver, Colo	1	0	12	0	1	0	2	1	1	1	0	12
Detroit, Mich	1	0	------	0	5	1	4	5	13	0	1	116
Duluth, Minn	0	0	------	0	0	0	1	1	2	0	0	10
Fall River, Mass	1	0	------	0	0	0	0	0	1	0	0	6
Fargo, N. Dak	0	0	------	0	1	0	2	1	1	0	0	0
Flint, Mich	0	0	------	0	0	0	2	2	0	0	0	7
Fort Wayne, Ind	0	0	------	0	0	0	1	0	0	0	0	0
Frederick, Md	0	0	------	0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	------	0	0	0	1	0	0	0	0	0
Grand Rapids, Mich	0	0	------	0	2	0	0	0	0	0	0	0
Great Falls, Mont	0	0	------	0	0	0	0	0	0	0	0	2
Hartford, Conn	1	0	------	0	0	0	0	3	0	0	0	12
Helena, Mont	0	0	------	0	0	0	0	0	0	0	0	1
Houston, Tex	6	0	------	0	0	0	3	0	0	0	0	1
Indianapolis, Ind	0	0	------	0	2	0	10	0	7	0	0	7
Kansas City, Mo	0	0	------	0	0	0	2	0	7	0	1	2
Kenosha, Wis	0	0	------	0	0	0	1	0	1	0	0	6
Little Rock, Ark	1	0	------	0	0	0	0	0	0	0	0	3
Los Angeles, Calif	2	0	11	0	9	0	4	1	9	0	0	11
Lynchburg, Va	4	0	------	0	0	0	0	0	0	0	0	1
Memphis, Tenn	0	0	------	0	0	0	5	0	0	0	2	2
Milwaukee, Wis	0	0	------	0	4	0	2	0	11	0	0	51
Minneapolis, Minn	0	0	------	0	1	0	1	2	10	0	0	19
Missoula, Mont	0	0	------	0	0	0	0	0	0	0	0	3
Mobile, Ala	2	0	------	1	0	0	0	0	0	0	1	0
Nashville, Tenn	0	0	------	0	0	0	2	0	3	0	0	2
Newark, N. J	0	0	1	0	6	0	0	2	4	0	0	14
New Haven, Conn	0	0	------	0	1	0	0	0	0	0	0	14
New Orleans, La	0	0	1	0	1	0	3	0	2	0	1	0
New York, N. Y	5	0	6	0	9	1	36	5	33	0	7	139
Omaha, Nebr	3	0	------	0	0	0	1	0	1	0	0	0
Philadelphia, Pa	2	0	1	1	11	0	26	0	16	0	2	95
Pittsburgh, Pa	0	0	------	0	4	0	5	2	2	0	0	12
Portland, Maine	0	0	------	0	1	0	1	0	1	0	0	17
Providence, R. I	0	0	------	0	0	0	0	0	3	0	0	31

City reports for week ended September 26, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Pueblo, Colo	0	0		0	0	0	0	0	0	0	0	4
Racine, Wis	0	0		0	2	0	0	0	2	0	0	3
Raleigh, N. C	0	0		0	0	0	0	0	3	0	0	5
Reading, Pa	0	0		0	0	0	1	0	0	0	0	5
Richmond, Va	0	0	2	0	0	0	1	0	4	0	0	3
Roanoke, Va	0	0		0	0	0	0	0	0	0	0	0
Rochester, N. Y	0	0		0	0	0	1	1	1	0	1	20
Sacramento, Calif	0	0		0	1	0	1	0	1	0	0	6
Saint Joseph, Mo	0	0		0	0	0	5	0	0	0	0	0
Saint Louis, Mo	1	0		0	2	0	5	1	2	0	0	2
Saint Paul, Minn	0	0		0	0	0	3	0	1	0	0	18
Salt Lake City, Utah	0	0		1	9	0	1	0	1	0	0	4
San Antonio, Tex	0	0		0	0	0	1	0	0	0	0	3
San Francisco, Calif	0	0		0	7	0	6	0	3	0	0	6
Savannah, Ga	0	0		0	0	0	1	0	1	0	0	1
Seattle, Wash	1	0		0	2	0	1	1	2	0	1	6
Shreveport, La	5	0		0	0	0	0	0	1	0	1	0
South Bend, Ind	0	0		0	2	0	0	0	0	0	0	0
Spokane, Wash	0	0		0	5	0	2	0	8	0	0	0
Springfield, Ill	0	0		0	0	0	1	0	1	0	0	3
Springfield, Mass	0	0		0	0	0	2	0	17	0	0	0
Superior, Wis	0	0		0	0	0	0	0	0	0	0	3
Syracuse, N. Y	0	0		0	0	0	4	0	0	0	0	12
Tacoma, Wash	0	0		0	7	0	0	0	1	0	0	2
Tampa, Fla	0	0		0	0	0	2	0	0	0	0	0
Terre Haute, Ind	1	0		0	0	0	0	0	0	0	0	0
Topeka, Kans	0	0		0	0	0	1	0	1	0	0	0
Trenton, N. J	0	0		0	4	0	0	0	0	0	0	0
Washington, D. C	2	0		0	1	0	3	1	14	0	1	17
Wheeling, W. Va	0	0		0	0	0	0	0	0	0	0	0
Wichita, Kans	0	0		0	0	0	3	1	1	0	0	14
Wilmington, Del	0	0		0	0	0	3	1	0	0	0	1
Wilmington, N. C	0	0		0	0	0	0	0	0	0	0	4
Winston-Salem, N. C	0	0		0	0	0	3	0	3	0	0	2
Worcester, Mass	0	0		0	0	0	3	0	8	0	0	23

Dysentery, amebic—Cases: Birmingham, 1; Chicago, 1; New York, 1; Sacramento, 1.

Dysentery, bacillary—Cases: Atlanta, 1; Baltimore, 7; Chicago, 4; Detroit, 2; Los Angeles, 4; Minneapolis, 1; Nashville, 1; New York, 32; Philadelphia, 1; Richmond, 3; St. Paul, 1; San Francisco, 2.

Rocky Mountain spotted fever—Cases: Richmond, 1; St. Louis, 1.

Typhus fever—Cases: Atlanta, 1; Baltimore, 1; Birmingham, 4; Charleston, S. C., 2; Galveston, 1; Los [illegible] Salem, 1.

Rates (annual basis) per 100,000 population for the group of 90 cities included in the preceding table (estimated population, 1942, 34,134,198)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Sept. 26, 1942	9.47	8.10	0.61	20.16	35.50	43.54	0.15	4.28	162.90
Average for week 1937–41	12.66	7.26	1.70	[1] 21.15	[1] 42.15	50.79	0.31	8.49	164.73

[1] Median.

PLAGUE INFECTION IN CALIFORNIA

Plague infection has been reported proved in specimens collected in California as follows:

Eldorado County: August 4, 1942, in pools of 31 fleas from 9 golden mantled ground squirrels, *C. lateralis* sp., taken 1 mile south and 1 mile west of Meyers, and 28 fleas from 16 chipmunks, *Eutamias* sp., taken 3½ miles south of Meyers.

Los Angeles County: July 23, in tissue from 1 ground squirrel, *C. beecheyi*, taken 1 mile west of Gorman.

Modoc County: July 3, in a pool of 22 fleas from 16 chipmunks, *Eutamias* sp., taken in the Modoc National Forest, at Likely Saw Mill, 9 miles west of Likely.

Monterey County: August 5, in a pool of 50 fleas from 6 ground squirrels, *C. beecheyi*, taken from Fort Ord Military Reservation, Area E; August 7, in a pool of 155 fleas from 11 ground squirrels, same species, taken from the north portion of Area E, on the reservation.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—Rats proved positive for plague have been found in Paauhau Area, Hamakua District, Island of Hawaii, T. H., as follows: August 17, 1942, 1 rat; August 18, 2 rats; August 19, 1 rat; August 25, 1 rat; August 29, 1 rat.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended September 12, 1942.—During the week ended September 12, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis					5					5
Chickenpox				15	32	8	11	5	31	102
Diphtheria		22	2	8	1	5	1	1		40
Dysentery				8	3				5	16
German measles					3		7		4	14
Influenza					1				2	3
Lethargic encephalitis						2	1			3
Measles				13	13	6	23	2	4	61
Mumps		8	1	8	99	12	9	2	66	205
Pneumonia		1			5				4	10
Poliomyelitis	1	21	3	11	8	5	1	2	6	58
Scarlet fever		2	7	35	46	10	12	16	27	155
Trachoma									1	1
Tuberculosis			2	46	61			7	10	126
Typhoid and paratyphoid fever		1	3	6	4			2		16
Undulant fever						1			2	3
Whooping cough			1	532	81	20	8	6	14	662
Other communicable diseases		4		2	239	43	2	1	3	294

CUBA

Habana—Communicable diseases—4 weeks ended September 20, 1942.—During the 4 weeks ended September 20, 1942, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	13		Scarlet fever	3	
Malaria	8		Tuberculosis	9	1
Measles	15		Typhoid fever	22	1
Poliomyelitis	19	1			

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Cholera

China—Shanghai.—During the week ended July 11, 1942, 1 case of cholera was reported in Shanghai, China.

Plague

Senegal—Tivaouane.—During the period September 1–10, 1942, 1 fatal case of plague was reported in Tivaouane, Senegal.

Typhus Fever

Hungary.—During the week ended September 5, 1942, 5 cases of typhus fever were reported in Hungary.

Morocco.—During the week ended September 12, 1942, 29 cases of typhus fever were reported in Morocco.

Tunisia.—During the period August 21–31, 1942, 101 cases of typhus fever were reported in Tunisia.

Turkey.—During the week ended September 19, 1942, 9 cases of typhus fever were reported in Turkey.

Yellow Fever

Ivory Coast—Bobo Dioulasso.—On September 21, 1942, 1 suspected case of yellow fever was reported in Bobo Dioulasso, Ivory Coast.

Sudan (French)—Region of Bafoulabe.—On September 18, 1942, 1 death from suspected yellow fever was reported in the Region of Bafoulabe, French Sudan.

AN INDEX TO THE LITERATURE OF THE SIPHONAPTERA OF NORTH AMERICA [1]

A Review

The geographical area covered by this index to the literature on fleas is the North American continent north of Mexico, and also Greenland.

In addition to the species catalog, which occupies the main body of the text, there is included a synopsis of the families, subfamilies, and genera, a guide to type localities, a bibliography of over 300 references, and an index which includes all synonyms and lists each species under each specific and generic name to which it has been referred.

In the catalog proper the 7 families and 12 subfamilies are listed in their systematic order and a rather extensive synonymy is given for each. Following this, the genera are entered alphabetically, and the species and subspecies are entered alphabetically under each genus. Under each generic name are given the genotype and the generic synonymy. Under each species are listed all references relating taxonomically to that species, with host and locality data. The reference to the original description shows whether the species was described from the male, the female, or both sexes, and gives the type host and type locality. Synonyms are given in their original terminology under the name of the species with which they are now considered synonymous. Host names are given as originally cited. All such names needing correction or interpretation are dealt with in a section on host names and synonymy following each genus.

[1] Index to the literature of Siphonaptera of North America, by Wm. L. Jellison and Newell E. Good, National Institute of Health Bulletin No. 178. Government Printing Office, Washington, 1942. Price 25 cents.

FEDERAL SECURITY AGENCY

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Public Health Reports

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Public Health Reports

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THE PRODUCTION OF CARIOUS LESIONS IN THE MOLAR TEETH OF HAMSTERS (*C. AURATUS*)[1]

By Francis A. Arnold, Jr., *Passed Assistant Dental Surgeon, United States Public Health Service*

Investigations concerning the etiology of dental caries have been handicapped by the lack of a suitable laboratory animal which will develop dental caries similar in all respects to human dental caries. Numerous species have been tried, but at present the albino rat is the only common laboratory animal which is used to any great extent in experimental caries studies. A factor difficult to evaluate in studies on rat caries is the etiological importance of the particle size of the cereals used in the caries-producing diets. Diets which contain coarse ground cereals will produce carious lesions in the molar teeth of rats, but the same diet with finely ground cereals will not (*1, 2, 3*). This fact has restricted the use of synthetic diets in experimental caries studies in rats.

Examinations of the molar teeth of Syrian hamsters (*C. auratus*) at the National Institute of Health revealed an occlusal configuration somewhat similar to that of rat molar teeth. It was also found that hamsters occasionally had lesions resembling caries in their molar teeth. These observations suggested an investigation of the susceptibility of these teeth to induced caries. Results of preliminary experiments indicated that cereal-containing diets similar to those used in studies on induced caries in rats were also effective in hamsters. Experiments were then planned to determine whether the particular size of the cereal in the diet had the same etiological influence on dental caries in hamsters as it does in rats. A second experiment was made to test the feasibility of using cornstarch rather than corn meal in the caries-producing diet.

EXPERIMENTAL PLAN

The animals in these experiments were young male and female hamsters from the stock colony at the National Institute of Health. After weaning, all animals were kept on a stock ration consisting of food pellets plus lettuce and carrots until they were 35 days of age.

[1] From the Division of Infectious Diseases, National Institute of Health.

In the first experiment 90 litter mates were distributed into 3 groups, and each group was fed one of the following diets:

No. 510.—Corn meal, 66 percent; whole-milk powder, 30 percent; alfalfa, 3 percent; NaCl, 1 percent. The corn meal used in this diet was a coarse ground meal of which only 3 percent passed a 60-mesh sieve.

No. 512.—The same ingredients as diet No. 510, but the corn meal was ground in a ball mill for 48 hours before mixing with the other constitutents. Tests indicated that practically all of this corn meal passed a 60-mesh sieve after such treatment.

Stock ration.—Commercially prepared food pellets with a guaranteed analysis as follows: Not less than 17.5 percent protein, not less than 2.5 percent fat, not more than 8.5 percent fiber, and not less than 58.0 carbohydrate.

All animals were given carrots or lettuce once each week and received distilled water and diet *ad libitum*. The animals were kept on these diets for 90 to 95 days at which time they were sacrificed. The jaws and teeth were separated from the surrounding tissues and dried. The molar teeth were examined by the use of a wide field low power microscope (X22.5) and all dental lesions recorded.

In the second experiment a group of 26 male and 26 female hamsters was given a diet (No. 610) similar in all respects to diet No. 510 described above except that cornstarch was used instead of corn meal. The animals were fed this diet and distilled water *ad libitum* plus lettuce or carrots once each week for a period of 95 to 100 days, at which time they were killed. The jaws and teeth were removed and dried, and the molar teeth were examined by low power microscope as in the first experiment. All observable dental lesions were recorded.

RESULTS

Data in respect to the incidence and amount of dental caries observed in hamsters fed these different diets are shown in tables 1 and 2.[2] The results are recorded on the basis of two types of carious lesions, occlusal and cervical. Occlusal carious lesions are those which apparently originated in pits or fissures on the occlusal area of the tooth, being similar in macroscopic appearance to carious lesions on the occlusal surfaces of the molar teeth of rats and humans. Cervical carious lesions are those lesions which occurred on the mesial surface of the first molars, both upper and lower, near the cemento-enamel junction and extending around the cervical portion of the tooth usually more to the lingual than to the buccal.[3]

[2] Attention is called to the fact that the results are recorded for male and female animals together as there was a relatively equal distribution of sex in each group. However, we were impressed by the fact that in these two experiments the males in each group had the greater number of teeth affected. Further study will be necessary to evaluate this variable respecting possible sex differences

[3] Although this lesion was recorded only on the first molars in these animals, other questionable areas were observed on the second and third molars. It was deemed advisable at the present time to consider these areas on the proximal of the second and third molars as questionable caries until they can be studied more carefully by the use of ground sections.

In order to give the reader an idea as to the occlusal anatomy of hamster teeth, a photograph of an artist's sketch of the occlusal surfaces of the upper and lower molars of the rat and the hamster is shown in figure 1. As may be seen in this photograph, there are distinct differences in the occlusal areas of the molar teeth of these two animals, although the general configuration is of similar type. In the rat molars narrow deep fissures are found, but in the hamster teeth the fissures are shallow and wide. There is considerably more exposed dentine on the tips of the cusps of the rat molars than on the cusps of the hamster teeth. Features such as these should be considered when comparing caries in hamsters with rat and human caries. Photographs of the different types and sizes of lesions observed in the teeth of the animals used in these experiments are presented in figure 2.

TABLE 1.—*The incidence and amount of caries in the molar teeth of hamsters fed three different diets*

Treatment	Number of animals	Number of litters	Occlusal caries [1]: Animals with—	Occlusal caries [1]: Teeth with—: Upper	Occlusal caries [1]: Teeth with—: Lower	Occlusal caries [1]: Teeth with—: Both	Cervical caries [1]: Animals with—	Cervical caries [1]: Teeth with—: Upper	Cervical caries [1]: Teeth with—: Lower	Cervical caries [1]: Teeth with—: Both	Animals showing either or both types of caries
Diet No. 512 (fine corn meal):											
Number	28	11	18	38	40	78	17	8	29	37	22
Percent [2]			64	23	24	23	61	14	52	33	79
Average number per animal [3]				2.1	2.2	4.3		0.5	1.7	2.2	
Diet No. 510 (coarse corn meal):											
Number	28	12	14	11	20	31	5	2	8	10	14
Percent			50	7	12	9	18	4	14	18	50
Average number per animal				0.8	1.4	2.2		0.4	1.6	2.0	
Diet—Stock ration:											
Number	30	12	4	0	4	4	0	0	0	0	4
Percent			13	0	2	1	0	0	0	0	13
Average number per animal				0	1.0	1.0		0	0	0	

[1] Defined in the text.
[2] The percentages for teeth with occlusal caries are based on six upper and six lower molar teeth per hamster but the percentages for teeth with cervical caries are based on the two upper and two lower first molars per animal.
[3] Averages are based only on the number of hamsters in each group which showed caries

The results shown in table 1 indicate that carious lesions occurred in some of the hamsters on all three diets, but there is a considerable difference in the incidence and amount that occurred. Those animals which were fed diet No. 512 (fine corn meal) had a greater percentage of their molar teeth showing carious lesions of both the occlusal and cervical types than did their litter mates in either of the other two groups. In those hamsters that had carious teeth the average number of teeth with occlusal lesions was twice as high in the animals that received diet No. 512 as in those fed diet No. 510 and four times as great as in those given a stock ration.

The results of the second experiment, shown in table 2, indicate that carious lesions can be produced in the molar teeth of hamsters when the diet contains cornstarch rather than corn meal. Of the 52

animals fed this cornstarch diet, 30, or 58 percent, had occlusal caries, and 66, or 21 percent, of their molar teeth were affected. Almost 50 percent of this group showed cervical caries with 48, or 23 percent, of their first molars affected. There is also some evidence in these results that there may be a difference in the caries susceptibility of different litters, for example, litter No. 210 had 100 percent of the animals showing occlusal caries, whereas litter No. 209 had only 30 percent with this type of lesion. More animals and more litters, however, would be needed to determine whether or not this litter membership factor is as important in hamster studies as has been reported for rats (*4*).

TABLE 2.—*The incidence and amount of caries in the molar teeth of hamsters fed a diet, the cereal content of which was cornstarch*

Litter No	Number of animals	Occlusal caries [1]: Animals with	Occlusal caries [1]: Teeth with—Upper	Occlusal caries [1]: Teeth with—Lower	Occlusal caries [1]: Teeth with—Both	Cervical caries [1]: Animals with	Cervical caries [1]: Teeth with—Upper	Cervical caries [1]: Teeth with—Lower	Cervical caries [1]: Teeth with—Both	Number of animals showing either or both types of caries
188	4	3	1	4	5	1	1	2	3	3
190	9	3	1	3	4	8	1	11	12	8
195	3	2	3	4	7	1	0	2	2	2
200	7	3	2	2	4	2	0	3	3	3
201	8	5	4	3	7	1	0	2	2	6
209	10	3	2	6	8	5	2	9	11	6
210	11	11	7	24	31	6	4	11	15	11
Total	52	30	20	46	66	24	8	40	48	39
Percent [2]		58	6	15	21	46	8	38	23	75
Average number per carious hamster	-	-	0.6	1.5	2.2	--	0.3	1.6	2.0	----

[1] As defined in the text

[2] The percentages for teeth with occlusal caries are based on 12 molar teeth per animal, the percentages for teeth with cervical caries are based on the two upper and two lower first molars per animal

DISCUSSION

Insofar as is known this is the first report of carious lesions being produced in the molar teeth of the Syrian hamster. This finding opens a new field in the study of experimental dental caries in an animal which, like the rat, is a good laboratory animal. Also of importance is the fact that carious lesions occurred in those animals which received a diet containing fine ground corn meal. This result indicates that the hamster may be a better experimental animal for studying dental caries than the rat, since it is apparently necessary in the case of the latter animal to have coarse cereal particles present in the diet in order to induce dental caries.

Obviously too little is known at present concerning these carious lesions in hamster teeth to theorize as to their etiology. From the

FIGURE 1 —A photograph of an artist's sketch of the upper and lower right molars of the rat (A and C) and the hamster (B and D).

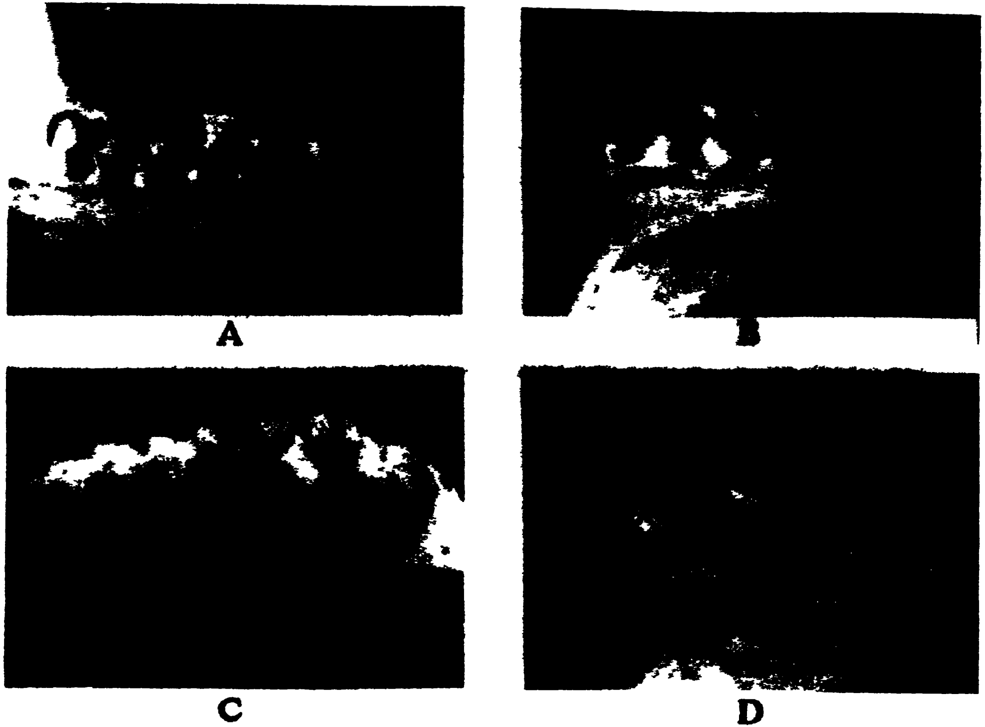

FIGURE 2.—Photographs of carious lesions in the molar teeth of hamsters. (A) Lesions in the upper left molars involving the mesio-occlusal angle of the second molar and the mesio-occlusal and centro-occlusal portions of the third molar. (B) A lesion involving almost the entire occlusal area of the upper right third molar. (C) Lesions involving the buccal and occlusal surfaces of the lower left second and third molars. (D) Cervical type of lesion involving the mesio-buccal angle and extending onto the lingual and buccal surfaces in the cervical region of the lower left first molar.

observations made so far without the aid of microscopic sections, it appears that the carious process originates in the enamel and progresses into the dentine. Lesions were found which had a small enamel opening leading to a much larger decalcified area in the dentine, thus leaving overhanging enamel edges. Other lesions had progressed to the point where almost all of the crown of the tooth was destroyed. Similar to dental caries in humans and rats, the susceptible areas on the occlusal surface of the molars in hamsters appear to be those places favorable for the retention of food particles. However, it may be well to emphasize that those factors involved in the retention of food particles on the occlusal surfaces of the teeth may be different in the hamster from those in the rat. When one considers the difference in the anatomy of the molar teeth of these animals (fig. 1), it appears likely that conditions favoring a severe *impaction* of food particles are present to a much greater degree in the molars of the rat than in those of the hamster. Although the facilities favoring food impaction are apparently reduced in hamster teeth, carious lesions occurred in those animals fed a finely ground diet as well as in those receiving the coarse ground cereal diet. Such results suggest that enamel fracture caused by impaction of food particles was of little or no importance in the production of the carious lesions found on the occlusal surfaces of the molar teeth of these animals.

Another interesting observation made on these hamsters was the presence of a cervical type of dental lesion in those animals given the caries-producing diets (fig. 2D). These lesions were similar macroscopically to that type of caries which occurs on the cervical portions of the buccal and lingual surfaces of the molar teeth of humans. The observations made so far indicate that the lesion in hamsters started near the cemento-enamel junction, usually on the mesial surface of the first molars, and progressed around the cervical portion of the tooth. Sometimes the lesion involved a good portion of the mesial, lingual, and buccal surfaces. Future studies may show that these lesions are comparable to smooth surface caries in human teeth.

The results obtained in the second experiment (table 2), in which cornstarch replaced corn meal in the diet, seem encouraging from the standpoint of using synthetic diets in experimental caries studies on this animal. As they are not litter mate animals, the results on the hamsters in this experiment are not directly comparable to the results obtained in the first experiment (table 1). It would appear, however, that the cornstarch diet has definite caries-producing qualities because the incidence, amount, and type of caries observed in the hamsters fed this diet were similar to those found in the group of animals which received the coarse corn meal ration (No. 510).

SUMMARY

1. Carious lesions have been produced in the molar teeth of a new and practical laboratory animal, the Syrian hamster (*C. auratus*).

2. The production of these carious lesions is not dependent upon the presence of a coarse particle cereal in the diet, as the greatest amount of caries occurred in those animals fed a finely ground corn meal ration.

3. Carious lesions were observed in the molar teeth of hamsters fed a diet in which cornstarch replaced the corn meal. This result suggests the possibility of adapting a strictly synthetic diet to the study of experimental caries in these animals.

4. At least two distinct types of lesions were observed; one originated in the pits and fissures of the occlusal area of the molar teeth, and the other originated in the cervical portions of the proximal surfaces, mostly in the upper and lower first molars.

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AN ANALYSIS OF SANITARY FACILITIES IN THE UNITED STATES*

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In an earlier report,[1] availability of sanitary facilities by family income and by color were presented for households in each of 83 cities and in 23 rural counties enumerated in the National Health Survey.[2] This paper supplements the material already reported upon

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** Resigned July,

[1] Adequacy of urban housing in the United States as measured by degree of crowding and type of sanitary facilities. National Health Survey, Preliminary Reports, Sickness and Medical Care Series, Bulletin No. 5, Division of Public Health Methods, National Institute of Health, U. S. Public Health Service, Washington, 1938 (Reprinted, 1939).

See also Britten, R. H., Brown, J. E., and Altman, I.: Certain characteristics of urban housing and their relation to illness and accidents: Summary of findings of the National Health Survey. Milbank Memorial Fund Quarterly, 18:91 (1940).

[2] A description of the technique employed in the National Health Survey for securing information pertaining to sanitary facilities is contained in a paper by Perrott, G. St. J., Tibbitts, C., and Britten, R. H.: The National Health Survey. Scope and method of the Nation-wide canvass of sickness in relation to its social and economic setting. Pub. Health Rep., 54: 1663 (1939) (Reprint 2098).

by presenting tabulations of sanitary facilities [3] by geographic area and color, by city size, by type of dwelling, and by monthly rental or owner's estimate of dwelling value in dollars.

This report is based largely on information gathered from 611,698 households (known as to type of toilet facilities) within the city limits of 83 urban communities in 18 States. The data were collected by trained enumerators from the housewife or other responsible member of the household. The cities were chosen to be representative of urban United States generally and have been classified into four geographic regions. Rural areas of 23 counties were included, 16 of which were in Georgia, 3 in Missouri, and 4 in Michigan. It is believed that the data obtained reflect accurately conditions in the urban communities in each broad region. However, the rural data represent only the counties for which information is available.

Approximately 10 percent of all urban households canvassed in the survey were excluded from this report by confining consideration to those households containing "real" families; that is, households with at least one person related to the head. Those omitted were mainly single-person households, dormitories, and rooming houses in charge of individuals with no person related to them living in the household.

Fifty-one of the eighty-three cities were enumerated completely. In order to avoid too great overrepresentation of large city populations, 32 large cities (31 of which were over 100,000 in population) were sampled. The samples enumerated in the larger cities varied from 5,000 to 45,000 households, not according to a fixed ratio but on the basis of the number believed adequate to represent the individual community, and the number required on the basis of regional and size distribution. The ratio of households canvassed to total households in the sampled cities ranged from 1 to 2 in the smaller cities to about 1 to 38 in the largest cities.[4]

Dwelling units were classified as "owner-occupied" or "tenant-occupied." The tenant-occupied dwellings were further subdivided into "multiple" and "single." The "multiple" ones were those in struc-

[3] The sanitary (toilet) facilities of the households enumerated in the survey were reported as "private" or "communal" and as "flush, inside," "flush, outside," or "privy." The definitions of these classifications are as follows:

Private inside flush toilet.—Toilet or water closet with flush bowl, connected to any water supply and customarily used by the members of one household only, i. e., not shared with any other household.

Private outside flush toilet.—Toilet or water closet with flush bowl located outside of the dwelling proper, as on the porch or in the yard, connected to a water supply and customarily used by members of one household only.

Communal flush toilet.—Toilet or water closet with flush bowl either inside or outside the dwelling and used by two or more households, that is, shared with another household. A flush toilet in the hall of a tenement serving several families is an example.

Privy.—Toilet without flush bowl and not connected to a water supply. The term includes outhouses and chemical closets.

[4] The population to be sampled was determined by a random selection of many small districts based on those used in the United States Census of 1930. For more detailed explanation see reference given in footnote 2.

tures in which the entrance from the street was used in common by more than one household. Since less than 5 percent of all owner-occupied dwelling units were of the multiple type, no corresponding separation has been made for this group in this report.

DISTRIBUTION OF HOUSEHOLDS AND TYPES OF SANITARY FACILITIES

Distribution of households.—In order to interpret the information to be presented on sanitary facilities, it is necessary to know something of the distribution of households according to size of city, color,[5] type of dwelling, and rental (or value). Seventy-four percent of the dwelling units were in cities with populations of 100,000 and over; 14 percent in cities with populations between 25,000 and 100,000; and 12 percent in cities under 25,000. These figures indicate an overrepresentation of the large cities compared to urban areas generally. Because of the fact that the provision of different types of sanitary facilities varied widely with size of city, this discrepancy is of significance. Percentages for all city sizes combined, therefore, have been weighted in accordance with the distribution of households by size of city in the country generally (Census, 1930).

Sixty-five percent of the dwelling units were classified as rented; the others as owned. Of the rented, a little more than half were in "multiple dwellings." The percentage distribution of all dwelling units according to size of city and type was as follows:

Size of city	Rented			
	Total	Multiple	Single	Owned
All sizes	100.0	35.6	29.9	34.5
100,000 and over	73.8	30.3	20.0	23.5
25,000 to 100,000	14.2	3.0	5.6	5.6
Under 25,000	12.0	2.3	4.3	5.4

About 9 percent of the households were colored, though in the South this percentage rose to 32. Analysis of the households from the point of view of rental or value will be found in a separate report.[6]

Sanitary facilities (general data).—The percentage of households (urban, total) by type of sanitary facilities is as follows (weighted in

[5] The term "colored" as used in this paper includes Mexican and comprises all but the white race. With the exception of the western area, where about 60 percent of the colored households were other than Negro, the colored group was composed almost exclusively of Negroes.

[6] Britten, Rollo H., and Brown, J. E.: Urban housing and crowding: Relation to certain population characteristics as indicated by National Health Survey data. Public Health Bulletin No. 261. Of the rented dwellings 11 percent were under $10 a month; 16 percent, $10 to $15; 18 percent, $15 to $20; 28 percent, $20 to $30; and 27 percent, $30 and over. Of the owned dwellings the estimated value was below $3,000 in 31 percent.

accordance with the distribution of households by size of city in the country generally):

With private inside flush toilets	85.7
With private outside flush toilets	3.2
With communal inside flush toilets	2.6
With communal outside flush toilets	.7
With privy:	
Private	7.0
Communal	.6

The availability of various types of sanitary facilities varies with size of city, as shown in figure 1. Thus, 1.3 percent of all households in cities of 100,000 and over lack either inside or outside flush toilets (in other words, have privies), while the corresponding percentage is 17.3 in cities under 25,000. Communal flush toilets [7] are almost three times higher in the largest cities than in the cities having less than

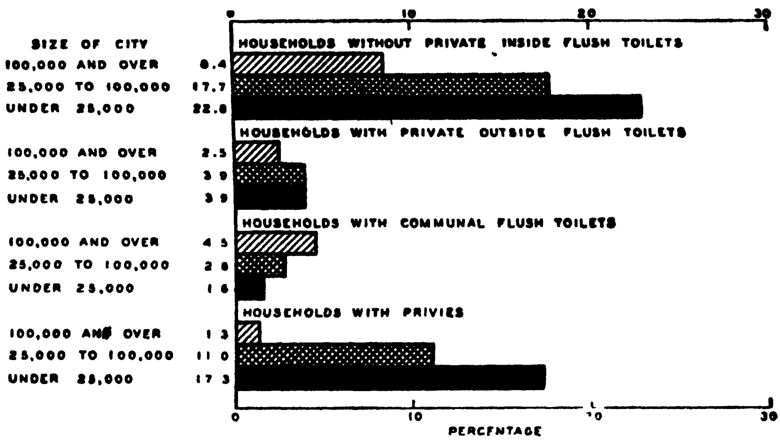

FIGURE 1.—Percentage of households with (or without) various types of sanitary facilities, by size of city.

25,000 population. This difference can be attributed in part to the greater proportion of multiple dwellings in the former. (See "Rural communities," p. 1611, for data on sanitary facilities in rural areas.)

The average percentages given in figure 1 fail to depict the wide variation from city to city in the percentage of households showing varying types of sanitary facilities. Such variations are so great as to make a consideration of the data for individual cities almost a necessity. Hence, the reader is referred to the bulletin presenting such percentages.[8]

The relationship of sanitary facilities to color, rental, and dwelling value will be discussed in the following paragraphs.

[7] No separation has been made in the figures or tables between communal toilets located inside and those located outside the dwelling because of the small number of the latter. Such a separation is made in Bulletin 5 (referred to in footnote 1).

[8] See Bulletin 5 referred to in footnote 1.

AVAILABILITY OF PRIVATE INSIDE FLUSH TOILETS

Urban communities.—Table 1 shows the distribution of urban households without private inside flush toilets by size of city and type of dwelling. In tables 2 and 3 the comparison is extended to region and color. The wide discrepancies between white and colored in the availability of this facility is apparent. When the same facility is analyzed by region, no great differences are to be found among the white populations for corresponding city sizes and types of dwellings.[9] The tables show that owned dwellings are better provided with private inside flush toilets, regardless of city size and color, than are rented single or multiple dwellings.

TABLE 1.—*Percentage of households without private inside flush toilets, by city size and type of dwelling*

Type of dwelling	City size			
	All city sizes[1]	100,000 and over	25,000 to 100,000	Under 25,000
All dwellings	14.3	8.4	17.7	22.8
Rented dwellings, total	17.3	10.9	21.6	26.2
Multiple	15.9	11.8	22.6	19.0
Single	17.5	9.5	21.1	30.0
Owned dwellings	9.1	3.0	11.6	18.6

[1] Weighted in accordance with proportion of population in specific city-size groups (Census, 1930)

TABLE 2.—*Percentage of households without private inside flush toilets, by region, city size, and type of dwelling and by color for the South*

City size and type of dwelling	Northeast	North Central	South			West
			Total	White	Colored	
100,000 and over, all dwellings	5.5	8.6	20.4	7.3	51.3	3.9
Rented dwellings, total	6.8	11.4	25.4	9.2	55.2	5.6
Multiple	7.1	14.1	25.2	12.4	59.3	14.0
Single	5.9	6.2	25.5	6.6	53.4	2.0
Owned dwellings	2.2	2.9	8.1	3.7	30.6	1.5
25,000 to 100,000, all dwellings	10.4	15.8	25.7	8.9	80.3	4.6
Rented dwellings, total	12.4	18.8	30.0	10.2	84.8	7.1
Multiple	8.4	27.5	29.0	11.7	86.5	14.5
Single	16.5	16.3	30.6	9.2	83.9	4.1
Owned dwellings	7.7	12.0	16.5	6.5	65.2	2.0
Under 25,000, all dwellings	15.8	27.1	39.6	23.7	78.1	11.2
Rented dwellings, total	17.7	31.1	43.1	25.8	81.8	12.2
Multiple	6.3	22.2	36.3	22.1	79.8	14.4
Single	26.4	35.5	46.4	27.9	82.5	11.3
Owned dwellings	13.9	23.2	32.7	19.8	69.3	10.1

[9] Care should be exercised in drawing conclusions with respect to a particular area and size group because of the possibility that surveyed cities in that group may inadequately represent the group as a whole. This is especially true in the group of cities from 25,000 to 100,000 population (2 in Northeast, 3 in North Central, 4 in South, and 1 in West).

TABLE 3.—*Percentage of households without private inside flush toilets in cities of 100,000 and over population, by region, color, and type of dwelling*

Type of dwelling	Region and color									
	All regions		Northeast		North Central		South		West	
	White	Colored	White	Colored	White	Colored	White	Colored	White	Colored
All dwellings	5.7	33.6	4.9	14 7	7.0	28.7	7.3	51.3	3.4	11.2
Rented dwellings, total	7 4	35.6	6.1	15.4	9.2	30.8	9 2	55 2	4.9	12.7
Multiple	9 1	34.9	6.6	14 9	11.4	36 3	12.4	59 3	12.6	38.1
Single	4.6	36.3	5.0	16.6	5.2	16.9	6.6	53.4	1.5	6.8
Owned dwellings	2.4	19.6	2.0	8.2	2.8	6.7	3.7	30.6	1.5	3.6

TABLE 4.—*Percentage of households without private inside flush toilets classified by size of city, color, and rental or value*

Type of dwelling and rental or value	Cities of 100,000 and over population				Cities of 25,000 to 100,000 population			Cities under 25,000 population		
	Northeast, North Central, and West		South		Northeast, North Central, and West	South		Northeast, North Central, and West	South	
	White	Colored	White	Colored		White	Colored		White	Colored
All dwellings, total	4.5	20 5	7.3	51.3	12 9	8.9	80.2	17.9	23.7	78.1
Rented dwellings, total	7.2	22.0	9.2	55 2	15.6	10.2	84.8	19.8	25.8	81.8
Under $10 a month	41 0	58 3	35 8	75.0	52 2	33.6	90.1	66.0	53.7	84.7
$10 to $15 a month	22.7	32 6	17 4	44.4	19.7	11.2	56.5	36.4	16.2	53.2
$15 to $20 a month	10.4	16 4	7 9	18.4	5.4	4 6	[1] 42.2	15.0	6.9	[1] 36 0
$20 to $30 a month	4.2	8.4	4.0	9.3	2.7	2.0	[1] 28 0	3.7	2.3	[1] 28.6
$30 and over a month	.73	3 7	.87	[1] 9.6	.96	.64	[1] 28.6	.67	1.3	------
Owned dwellings, total	2 2	6.7	3 7	30.6	9 5	6.5	6' 2	15.8	19.8	59.3
Under $1,000 value	33.5	[1] 40 0	46.1	58.6	57 0	41.5	81.9	68.3	76.2	88.2
$1,000 to $1,500 value	14 5	15.8	22 1	43.5	30.7	10.1	68.6	40.6	32.8	55.3
$1,500 to $2,000 value	7.9	12.6	10.6	29.2	16.4	4.1	55 6	24.6	18.2	47.7
$2,000 to $3,000 value	3.5	8.1	4.8	19.2	6.1	1.3	26.6	13.7	7.5	24.8
$3,000 and over value	1.0	2.6	.93	9.4	1.7	.87	24.6	3.6	1.8	[1] 14.8

[1] Fewer than 100 households.

The availability of private inside flush toilets by rental and dwelling value groups is given in table 4. The proportion of households lacking this facility diminishes rapidly with increased rental and dwelling value for all regions and city sizes, for both white and colored households. Here again, white households in the South and in other regions compare favorably by city size, rental, and dwelling value. However, differences persist between white and colored households even for rentals of more than $30 per month and owned dwellings valued at more than $3,000.

AVAILABILITY OF PRIVATE OUTSIDE FLUSH TOILETS

The percentage of households with private outside flush toilets is given in table 5 by city size and region (and by color in the South).

This facility is not very common, except among colored in the South. Significantly, however, rented single dwellings show slightly higher percentages in the availability of this facility than do multiple or owned dwellings.

TABLE 5.—*Percentage of households with private outside flush toilets, by region, city size, and type of dwelling and by color for the South*

City size and type of dwelling	Northeast	North Central	South			West
			Total	White	Colored	
100,000 and over, all dwellings	1.9	0.99	10.1	2.8	28.5	0.56
Rented dwellings, total	2.2	1.1	12.6	2.7	30.7	.62
Multiple	1.1	.94	7.0	1.2	22.4	.14
Single	4.8	1.4	16.8	4.0	34.3	.82
Owned dwellings	1.2	.72	3.9	1.4	16.9	.48
25,000 to 100,000, all dwellings	2.2	4.2	5.0	2.5	13.3	1.5
Rented dwellings, total	2.8	5.0	6.0	2.7	15.3	1.9
Multiple	53	3.0	4.2	1.8	12.2	1.1
Single	5.2	5.5	7.2	3.3	16.9	2.3
Owned dwellings	1.3	3.1	3.0	2.2	6.7	1.0
Under 25,000, all dwellings	2.5	1.1	11.5	5.4	26.0	1.4
Rented dwellings, total	3.6	1.1	14.5	7.1	31.2	1.7
Multiple	.73	.33	8.9	4.9	20.9	1.4
Single	5.7	1.5	17.3	8.3	34.9	1.8
Owned dwellings	1.4	1.1	5.3	2.4	13.5	.94

DISTRIBUTION OF COMMUNAL FLUSH TOILETS

Communal flush toilets are characteristic of multiple type dwellings, and this is amply illustrated in table 6. Since it was shown in figure 1 that communal flush toilets are much more frequent in cities of 100,000 and over than in smaller cities, the comparison has been limited to the former.

TABLE 6.—*Percentage of households with communal flush toilets (inside or outside) in cities of 100,000 and over population, by region, color, and type of dwelling*

Type of dwelling	Region and color									
	All regions		Northeast		North Central		South		West	
	White	Colored	White	Colored	White	Colored	White	Colored	White	Colored
All dwellings	3.5	14.5	3.1	6.5	4.4	21.0	3.5	16.3	2.3	7.7
Rented dwellings, total	5.0	16.3	4.2	7.1	6.3	22.7	5.2	19.0	4.1	9.2
Multiple	7.7	24.7	5.6	10.0	9.2	29.8	10.6	35.3	12.5	37.2
Single	.73	7.9	.52	.58	1.2	5.0	.76	11.8	.30	2.7
Owned dwellings	.50	1.7	.50	1.3	.60	2.4	.48	1.8	.10	.18

DISTRIBUTION OF PRIVIES

Urban communities.—Privies were more commonly found in the South than in other regions of the country. There was also a marked increase in the dependence on this facility as the size of the city

decreased, especially among colored in the South. (See tables 7 and 8.) In every region, privies are found in less than 2 percent of all white households and less than 7 percent of all colored households in cities of over 100,000 (table 9).

TABLE 7.—*Percentage of households with privies, by city size and type of dwelling*

Type of dwelling	City size			
	All city sizes [1]	100,000 and over	25,000 to 100,000	Under 25,000
All dwellings	7.7	1.3	11.0	17.3
Rented dwellings, total	8.2	1.3	12.5	18.0
Multiple	5.0	.79	9.5	9.8
Single	10.1	2.1	14.1	22.4
Owned dwellings	7.0	1.2	8.7	16.5

[1] Weighted in accordance with proportion of population in specific city-size groups (Census, 1930).

TABLE 8.—*Percentage of households with privies, by region, city size, and type of dwelling and by color for the South*

City size and type of dwelling	North-east	North Central	South			West
			Total	White	Colored	
100,000 and over, all dwellings	0.30	2.0	3.0	1.5	6.5	0.66
Rented dwellings, total	.29	2.3	2.8	1.3	5.5	.47
Multiple	.15	1.8	.82	.54	1.5	.06
Single	.65	3.2	4.1	1.9	7.3	.64
Owned dwellings	.30	1.5	3.5	1.8	11.9	.93
25,000 to 100,000, all dwellings	6.0	8.7	17.7	4.2	61.7	.95
Rented dwellings, total	6.1	8.9	19.7	4.2	62.8	1.2
Multiple	1.3	4.8	17.0	2.6	64.5	---------
Single	10.9	10.0	21.6	5.3	62.0	1.6
Owned dwellings	5.9	8.5	13.2	4.1	57.7	.72
Under 25,000, all dwellings	12.7	24.3	26.5	16.7	50.1	7.5
Rented dwellings, total	13.0	26.9	26.1	16.5	47.9	6.3
Multiple	3.2	13.2	22.3	11.5	55.5	.85
Single	20.5	33.7	28.0	19.2	45.2	8.6
Owned dwellings	12.3	21.7	27.1	17.2	55.4	8.9

As would be expected, privies are more frequent in rented single dwellings than in multiple rented dwellings. Owned dwellings fare somewhat better, although among colored in the South and in cities of 100,000 and over, owned dwellings occupied by colored households in every region except the North Central show a greater use of this facility.

Rural communities.—Data on the availability of privies in rural areas are given in table 10. A noticeable difference is found among relief and nonrelief households in Michigan and Missouri towns or villages. The table shows that nonrelief households in towns or villages are much better off in this respect than are relief households. Approximately half of the former households in Michigan use privies, but in other towns and villages in Missouri and Georgia the figure is

more than 85 percent. More than 90 percent of the households in purely rural areas are equipped with privies.

TABLE 9.—*Percentage of households with privies in cities of 100,000 and over population, by region, color, and type of dwelling*

Type of dwelling	Region and color									
	All regions		Northwest		North Central		South		West	
	White	Colored	White	Colored	White	Colored	White	Colored	White	Colored
All dwellings	0.95	4.5	0.24	1.2	1.7	5.5	1.5	6.5	0.64	1.0
Rented dwellings, total	.94	4.1	.24	.95	1.9	5.7	1.3	5.5	.43	.90
Multiple	.61	2.4	.12	.61	1.4	4.8	.54	1.5	.06	------
Single	1.5	5.7	.55	1.7	2.8	7.9	1.9	7.3	.59	1.1
Owned dwellings	1.0	7.7	.24	3.1	1.5	3.1	1.8	11.9	.92	1.3

TABLE 10.—*Percentage of households with privies in rural Michigan, Missouri, and Georgia classified by whether town or village or purely rural, by economic status, and type of dwelling and by color for Georgia*

ALL ECONOMIC STATUSES

All dwellings	58.0	86.9	88.6	98.6	93.0	98.9	92.4	97.4
Rented	61.1	89.1	93.6	99.1	94.1	99.2	94.0	98.6
Owned	56.1	85.9	81.2	97.5	92.4	98.7	88.9	97.1
RELIEF								
All dwellings	89.5	97.9	97.4	97.8	97.8	98.8	97.4	98.5
Rented	87.0	97.1	99.3	96.4	97.1	99.0	97.4	99.1
Owned	92.1	100.0	91.1	100.0	98.5	98.4	97.5	94.9
NONRELIEF								
All dwellings	51.8	86.1	87.4	98.7	92.2	98.9	91.8	98.4
Rented	53.7	87.5	92.6	99.2	93.3	99.3	93.4	98.5
Owned	50.8	85.1	80.5	97.2	91.7	98.7	88.4	97.3

[1] Includes households with no toilet facilities

SUMMARY

The present report [10] summarizes the data on sanitary (toilet) facilities collected in the course of the National Health Survey (1935–36). The dwelling units covered are confined to those containing "real" families, i. e., households with at least one person related to the head. The data for urban areas are regarded as reflecting accurately condi-

[10] This report is to be regarded as supplementary to one giving corresponding data for each of the cities surveyed. See Bulletin 5 referred to in footnote 1.

tions in urban communities generally. However, the rural data definitely represent only the counties for which information was available.

1. Fourteen percent of the urban households included [11] were without private inside flush toilets; more than half of this group (8 percent) used privies.
2. The smaller cities showed much larger percentages of households without private inside flush toilets.
3. The South fared worse than the rest of the country.
4. Colored households in the South showed the highest percentages without private inside flush toilets.
5. There was a close relation between type of sanitary facility and rental (or value).

Certain data of a limited character are shown for rural areas.

PRESENT STATUS OF STATE CANCER CONTROL PROGRAMS [1]

By LEONARD A SCHLELE, *Passed Assistant Surgeon, United States Public Health Service*

The pattern of present-day cancer control programs has been planned to make the best use of existing information on cancer care. While we have some knowledge of specific factors related to the etiology of the disease in some cases and therefore know how to prevent a few, our information is still so fragmentary as far as the causes of cancer as a whole are concerned that the control program is primarily a curative one.

Information on the extent of the problem with reference to incidence and mortality has been available for many decades; and even though the early data were crude, they were adequate to convince laymen and physicians alike that cancer occurred frequently and usually had a fatal outcome. As a result, fear was instilled into the minds of men, and cancer has been considered a loathsome and dangerous disease for centuries. Laymen often have a fatalistic attitude and ignore warning signs and symptoms because they think that little can be done to cure their disease, should it be cancer. Physicians, especially many of those educated earlier, are not always fully aware of the benefits which are available from therapy as we know it today.

The earliest effective treatment, judged by present standards, was surgery. Late in the nineteenth century the discovery of X-rays and later the isolation of radium served to add new weapons for the fight on cancer. Remarkable progress in effective use of surgery,

[11] Survey data for each size of city group weighted in accordance with the percentage of households in such groups in urban United States generally (Census, 1930)

[1] Presented at the American Public Health Association meeting in Atlantic City, N. J., October 15, 1941 (Health Officers Section).

X-ray, and radium, alone and in combination, has occurred in the last three decades.

The effort to control cancer must remain one of trying to see patients early in the course of the disease and of using our present knowledge of diagnosis and treatment promptly to combat it until the day arrives when scientists discover clues which will enable us to make the control program a preventive one. The broad organized attack on cancer today can be divided roughly into the following activities:

1. Efforts to educate laymen in the advantages of periodic physical examinations, in recognizing danger signals, and in the need for seeking early care.
2. Efforts to keep physicians aware of the importance of constantly looking for cancer in their patients, up-to-date in the newer knowledge of diagnosis and treatment, and cognizant of their ability or their limitations in caring for cancer patients.
3. Stimulation and aid in the organization of diagnostic and treatment centers and provision of direct or indirect public assistance to the needy in obtaining adequate care.
4. Research in statistical and fundamental scientific fields relating to cancer and in improving diagnosis and therapy.

The author asked health officers and cancer commissioners for information on programs in their States and received generous cooperation, for which he wishes to express his appreciation. By using the data thus supplied, and other information from files on State programs in the National Cancer Institute and the States Relations Division of the United States Public Health Service, individual cancer-control activities administered by State health departments and cancer commissions were tabulated by States and are presented in table 1. The activities are those in progress during the fiscal year which began July 1, 1941. Expenditures are for the preceding fiscal year, the last for which useful data are available.

ENABLING LEGISLATION

Eleven States have specific laws which designate cancer as a disease against which control measures are to be taken. The earliest cancer acts were passed in New York and Massachusetts in 1898 and 1926, respectively, and the most recent ones were signed in Maine and Texas during the present year. Some laws are broad enabling acts and direct that action should be taken to control cancer in a manner to be decided by the program-administering agency, while others give explicit directions on the details of each step that is to be taken, and place little or no discretion on methods to be followed in the hands of the program administrators.

Basic public health laws of most States provide authority for taking steps to control any disease which the boards of health deem necessary, and thereby authorize cancer control programs without benefit of special enabling legislation. That many health departments have acted against cancer under the authority of basic public health laws is

evident from the fact that there are many more States with programs than there are States with laws. It should be noted, however, that with few exceptions control programs are most extensive and appropriations have been largest and most consistent in States with specific cancer legislation.

AGENCY AND *METHOD OF ADMINISTRATION*

Twenty-seven States and the Territory of Hawaii, in addition to the 11 States with laws, carry on one or more activities designed to aid in the control of cancer, making the total number of States and insular possessions with programs 39. The active official agency administering a State-wide program in 36 of these is the health department. In 3 additional States there are cancer commissions appointed by the Governors and these function as separate State agencies. The health departments all cooperate with the cancer commissions in some measure.

Seven health departments have bureaus or divisions of cancer control, and the 3 States with cancer commissions have activities which can be ranked as bureaus or divisions of their State governments. Nine of these 10 agencies have full-time administrative personnel. The table shows that the 10 States referred to, with one exception, are those with laws and with extensive programs. The States which attack cancer on all fronts invariably have found it necessary to employ full-time personnel in order to make their programs most effective

CANCER REPORTING

Cancer is a reportable disease in 16 States. In 5 there are specific reporting laws, while in the remaining 11, regulations of the State boards of health make it reportable. Complete morbidity data are very valuable, but New York is the only State of the 16 in which a serious attempt has been made to encourage complete reporting.

LAY EDUCATION

Twenty-nine States have lay educational programs designed to increase the awareness of their citizens of the signs and symptoms of cancer and to urge them to seek early care. The extent of these programs varies widely. Activity in Massachusetts is on a large scale. Efforts are made throughout the year in that State to have volunteer physician-speakers present talks to organized groups which devote at least one meeting each year to cancer. Many States publish pamphlets and others purchase them from other agencies for local distribution. Motion pictures on cancer, especially one entitled "Choose to Live," have been used in the educational programs of most States, both before private groups and in commercial motion-picture theatres. Posters and other exhibit media have been used at county and State fairs and other public gatherings. There is an increasing effort to bring lay education to the students of high schools and colleges.

TABLE 1.—*Cancer control activities in health departments and cancer commissions during fiscal year beginning July 1, 1941*

State	Law [1]	Year passed	Administrative agency: State health department	Administrative agency: State cancer commission	Separate bureau or division	Full-time officer	Reporting: Law	Reporting: Regulation	Education: Lay	Education: Professional	Medical care [2]: Free tissue service: Central laboratory	Medical care: Free tissue service: Private laboratory	Medical care: Clinics: Diagnostic [3]	Medical care: Clinics: Treatment	Medical care: Special cancer hospital	Medical care: Follow-up service	Research: Statistical [4]	Research: Other	Expenditures in dollars 1940-41: State	Expenditures: Local and other	Expenditures: Title VI [5]	Expenditures: Total
Alabama			Yes						Yes	Yes											1,000	1,000
Arizona									Yes													
Arkansas			Yes					Yes [i]				Yes										(t)
California																						
Colorado			Yes					Yes	Yes	Yes											2,350	2,350
Connecticut	Yes	1935, 1941	Yes		Yes	Yes			Yes	Yes	Yes [g]	Yes [g]	Yes [g]	Yes [g]		Yes	Yes		4,920		6,500	11,420
Delaware			Yes				Yes		Yes													(v)
District of Columbia																						
Florida			Yes					Yes	Yes													(v)
Georgia	Yes	1937	Yes									Yes	Yes	Yes		Yes	Yes		22,069		22,901	44,970
Idaho			Yes						Yes	Yes											500	[a] 500
Illinois	Yes	1937, 1939	Yes [a]		Yes	Yes			Yes	Yes		Yes	Yes	Yes		Yes			18,500			18,500
Indiana			Yes						Yes													(v)
Iowa			Yes		Yes	Yes			Yes	Yes		Yes [i]	Yes	Yes		Yes			6,820		7,185	14,005
Kansas			Yes					Yes	Yes	Yes											500	500
Kentucky																						
Louisiana			Yes					Yes			Yes								2,000			2,000
Maine	Yes	1941	Yes							Yes		Yes	Yes	Yes		Yes						(v)
Maryland																						
Massachusetts	Yes	1926, 1927, 1928	Yes		Yes [e]	Yes			Yes	Yes	Yes		Yes	Yes	Yes [l]	Yes	Yes		453,596	(t)	39,005	492,601 [a]
Michigan			Yes						Yes	Yes										500	5,600	6,100
Minnesota			Yes						Yes	Yes												(v)
Mississippi			Yes					Yes		Yes			(k)	(k)								(v)
Missouri	Yes	1937	Yes [b]	Yes	Yes [f]	Yes					Yes	Yes	(s)	(s)	Yes [m]	Yes [o]			[s] 100,000	(t)		190,000 [s, x]
Montana			Yes					Yes	Yes	Yes											200	200
Nebraska			Yes						Yes													(v)
Nevada			Yes					Yes	Yes													(v)
New Hampshire	Yes	1931	Yes [c]	Yes	Yes [f]	Yes	Yes			Yes		Yes	Yes	Yes		Yes			35,000	(t)		35,000

New Jersey			Yes						Yes	Yes							Yes					(v)
New Mexico								Yes													600	600
New York	Yes	1898, 1931, 1939	Yes		Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes[n]	Yes	Yes	Yes[q]	439,155		17,990	457,145[s]
North Carolina																						
North Dakota			Yes						Yes													(v)
Ohio			Yes						Yes												600	600
Oklahoma			Yes						Yes	Yes						Yes[p]			300		2,100	2,400
Oregon			Yes						Yes							Yes[p]		Yes[r]			6,600	6,600
Pennsylvania			Yes[i]		Yes			Yes		Yes							Yes				34,090	34,090
Rhode Island			Yes				Yes		Yes	Yes												(v)
South Carolina	Yes	1939	Yes		Yes	Yes				Yes		Yes	Yes	Yes		Yes	Yes			(u)	24,750	24,750[x]
South Dakota																						
Tennessee			Yes						Yes													(v)
Texas	Yes	1941	Yes						Yes			Yes									7,500	7,500
Utah																						
Vermont	Yes	1939	Yes[b]	Yes	Yes[f]	Yes				Yes		Yes	Yes	Yes		Yes			20,000	(t)		20,000[x]
Virginia																						
Washington			Yes					Yes	Yes	Yes											1,000	1,000
West Virginia			Yes						Yes													(v)
Wisconsin			Yes				Yes		Yes	Yes	Yes[h]						Yes					(v)
Wyoming																						
Alaska																						
Hawaii			Yes[z]																			(y)
Puerto Rico																						
Virgin Islands																						
Total	11		39	3	10	9	5	11	29	22	7	11	10	10	3	13	8	2	1,102,359	500	181,031	1,283,890

[1] Not including cases in which reporting of cancer is the only law.
[2] State-aid is provided in the States shown with activities in this category.
[3] Not including those in State cancer hospitals.
[4] Not including simple mortality studies such as are made by all State vital statistics offices.
[5] Title VI, Social Security Act.
[a] State welfare commission has been authorized to purchase radium for use in State hospitals.
[b] State health department cooperates with Cancer Commission, making statistical data available and aiding in follow-up.
[c] State health department cooperates with Cancer Commission, making statistical data available.
[d] All activity temporarily discontinued July 31, 1941.
[e] Division of Adult Hygiene, most of work is cancer control. Division of Tuberculosis operates cancer hospitals.
[f] Cancer Commission is an administrative division of State government; only activity is cancer control.
[g] In process of development.
[h] State laboratory of hygiene.
[i] Medical school examines tissue for State laboratory of hygiene.
[j] Not State-wide; in State-aided clinics only.
[k] Tumor clinic in a county health department operated on a voluntary basis by local physicians.
[l] 2 hospitals; outpatient services and 195 total beds.
[m] 1 hospital; outpatient service and 85 beds (probable increase to 100 beds during year).
[n] 1 hospital; outpatient service and 108 beds.
[o] Available through nurses in local health departments.
[p] State health department furnishes follow-up worker for medical school tumor clinic.
[q] Fundamental research in a special biological laboratory administered by the Division of Cancer Control.
[r] Fundamental and clinical research aided by the State health department in the State university medical school.
[s] Includes operation of State cancer hospitals.
[t] Unknown amount.
[u] Duke Foundation pays $1 per day toward hospitalization of needy patients.
[v] Unknown; funds for cancer education not itemized in public health education expenditures.
[w] Unknown, 1940-41; $75,000, 1941-42.
[x] Approximate; actual amount exceeds this.
[y] Cost of radium program unknown.
[z] Radium is loaned by the Territorial board of health.

The American Society for the Control of Cancer, a voluntary health group, is the parent organization of the Women's Field Army which is organized in the States to carry on an annual subscription drive and to do lay education and other work in cancer control with the funds collected. In most States there is excellent cooperation between the official health agency and the Women's Field Army, and sometimes all lay cancer education in a State is done by this group. Direct financial and other assistance, such as purchase of pamphlets, posters, and movies, is given to them by many departments, and in one instance there is a direct State appropriation for this lay health organization.

PROFESSIONAL EDUCATION

No State health agency attempts to do professional education except in close cooperation with, and at the direction of, its State medical society. Twenty-two States are engaged in such activities. In some, monthly or periodic health department bulletins on cancer are sent to all practicing physicians and often to dentists and nurses. In others, cancer handbooks have been written and distributed. Teaching institutes and seminars have been utilized in a number of States. In some, meetings are held at various points in the State for specialists, and in others the topics discussed are broad enough to be of great value to general practitioners. One State employes a physician who spends his full time visiting the practicing physicians in the State and discussing the diagnosis and treatment of cancer and other related problems.

TISSUE DIAGNOSTIC SERVICE

Accurate diagnosis of cancer and proper evaluation of therapy can be made only if suspected tissue is given to a trained histopathologist for examination and opinion. Teaching the necessity for removing tissue for biopsy is often part of the professional educational program mentioned earlier. When such a program exists the demands for tissue diagnostic service expand and often place a heavy burden on the histopathologists in the States, especially in the matter of examination of tissue from medically indigent patients. Fifteen States provide tissue examination at State expense. In 4 the work is done in central State laboratories; in 9 it is subsidized in private laboratories; and in 2 additional States it is provided in both ways.

MEDICAL CARE

Long ago the complexities of the problem of caring for cancer patients were recognized by the American College of Surgeons. It became obvious that collaboration between surgeons, radiologists, pathologists, and other specialists was necessary if the best care was to be provided. Accordingly, the College set up standards for tumor

clinics and began a program to stimulate the development of diagnostic and treatment centers which would meet these standards. Over 300 such approved clinics now exist in the United States, and many more are in various stages of development. It is noteworthy that with few exceptions the standards set by States for clinics in their official programs closely conform to those of the American College of Surgeons and that the majority of the State clinics are approved by that organization.

Cancer care is costly, because it often requires extensive surgical and radiation therapy and hospitalization. For this reason many persons with cancer are unable to obtain adequate attention. Many voluntary hospitals provide care for limited groups of needy patients, but careful studies of such facilities in most States show that there is need for more extensive programs organized at the State level with financial aid for the care of needy patients if their lives are to be prolonged.

Many States have recognized their responsibilities for the care of needy patients with cancer. Three States have erected cancer hospitals with from 85 to 195 beds and additional outpatient services. Two of these States and 9 additional ones have aided the organization of numerous diagnostic and treatment clinics in private hospitals. The number of such clinics varies from 2 in Vermont to 23 in Massachusetts. Service is available to needy residents of the States in all cases and is also available for all residents in two of the instances.

Follow-up of cancer patients is important from the standpoints of encouraging them to come in for repeated examinations and of enabling proper appraisals of therapy to be made. Thirteen State programs include follow-up service. Some use only letters, but the majority use nurses from local health departments or social workers for home visits.

The Territorial department of health of Hawaii owns radium which it loans to physicians.

RESEARCH

One State health department has a biological research laboratory, and another subsidizes fundamental cancer research in a medical school. Six States have other research programs, including studies of epidemiology, morbidity, mortality, end results of therapy, effectiveness of lay and professional education, and related statistical subjects. The compilation of usual mortality data for all deaths including cancer for annual reports has not been used as an indication that a State has a statistical research program relating to cancer, because the author is interested only in programs which have been organized because of special interest in the cancer problem.

COST

It is impossible with the data available to ascertain exact costs of individual activities in control programs and to relate these to the extent of the job done. Certain programs in which only medical care is provided for the needy indicate that average costs vary from $40 to $60 per patient. These amounts represent payment of minimum hospital charges and include no compensation for physicians' services which are generously donated.

It is sometimes impossible to ascertain the cost of operation of a tissue service or of a cancer educational program because their individual costs are bulked with general laboratory or public health education budgets. Another part of the money spent in the State program in a few instances on which information was not available is that which is provided by the local community, usually the town or county, as its legally designated share of the cost of care for its residents. However, information was available showing the following expenditures during the year July 1, 1940, to June 30, 1941: State funds, $1,102,359; local and other funds, $500; Social Security Act, title VI, funds, $181,031; total $1,283,890.

SUMMARY

Current cancer control activities conducted by 39 health departments and 3 cancer commissions in 38 States and the Territory of Hawaii have been summarized.

Known expenditures for programs amounted to over $1,280,000 during the past fiscal year ending June 30, 1941.

Activities consist of lay and professional education, provision of diagnostic and treatment facilities, and research, primarily statistical.

The author has not attempted to evaluate the effectiveness of any activities or programs in this paper.

Interest in cancer control has increased rapidly in the past few years and most of the new programs have been developed since 1930. It seems likely that worthwhile gains in the fight against cancer will come through improvement and extension of current programs. Later, when our knowledge of the cancer process increases, it is hoped that the program can be improved to make it even more effective and that some day it may be primarily a preventive rather than a curative one.

DISABLING MORBIDITY AMONG INDUSTRIAL WORKERS, SECOND QUARTER OF 1942 [1]

By W. M. GAFAFER, *Senior Statistician, United States Public Health Service*

The material presented in this paper is based on periodic reports on disabling sickness and nonindustrial injuries from industrial plants

[1] From the Division of Industrial Hygiene, National Institute of Health. For the first quarter of 1942 see Public Health Reports, 57: 1344 (Sept. 4, 1942).

located in Pennsylvania, Illinois, Massachusetts, Connecticut, New York, Ohio, Maine, South Dakota, New Jersey, and Canada. Over 200,000 workers are covered, representing the male memberships of mutual sick benefit associations, group insurance plans, and company relief departments. The data presented deal with the frequency of sickness and nonindustrial injuries causing disability lasting more than one week.

TABLE 1.—*Frequency of disabling cases of sickness and nonindustrial injuries lasting 8 consecutive calendar days or longer among* MALE *employees in various industries, by cause, the second quarter of 1942 compared with the second quarter of 1941, and the first half of 1942 compared with the first halves of the years 1937–41, inclusive*

Cause (numbers in parentheses are disease title numbers from the International List of Causes of Death, 1939)	Annual number of cases per 1,000 males				
	Second quarter		First half		
	1942	1941	1942	1941	1937–41
Sickness and nonindustrial injuries [1]	96.7	93.5	109.9	116.0	108.2
Nonindustrial injuries (169–195)	10.5	10.7	11.3	11.1	10.8
Sickness [1]	86.2	82.8	98.6	104.9	97.4
Respiratory diseases	33.1	34.7	45.1	56.6	49.1
Influenza and grippe (33)	11.5	10.8	17.9	30.4	26.1
Bronchitis, acute and chronic (106)	5.1	5.1	7.1	6.4	5.7
Diseases of pharynx and tonsils (115b, 115c)	5.5	7.7	5.7	6.7	6.0
Pneumonia, all forms (107–109)	4.8	4.7	6.0	5.3	4.1
Tuberculosis of respiratory system (13)	.7	.8	.7	.7	.8
Other respiratory diseases (104, 105, 110–114)	5.5	5.6	7.7	7.1	6.4
Digestive diseases	15.7	14.4	15.9	14.5	14.2
Diseases of stomach except cancer (117, 118)	4.4	3.7	4.4	3.8	3.8
Diarrhea and enteritis (120)	1.5	1.1	1.5	1.1	1.1
Appendicitis (121)	5.1	5.1	5.2	5.1	4.8
Hernia (122a)	1.9	1.7	1.8	1.7	1.7
Other digestive diseases (115a, 115d, 116, 122b–129)	2.8	2.8	3.0	2.8	2.8
Nondigestive diseases	35.3	31.0	35.5	30.9	31.6
Diseases of heart and arteries, and nephritis (90–99, 102, 130–132)	4.3	4.2	4.6	4.4	4.5
Other genitourinary diseases (133–138)	2.6	2.3	2.5	2.2	2.4
Neuralgia, neuritis, sciatica (87b)	2.3	2.1	2.3	2.1	2.3
Neurasthenia and the like (part of 84d)	1.0	1.1	1.0	.9	1.0
Other diseases of the nervous system (80–85, 87, except part of 84d, and 87b)	1.1	1.3	1.2	1.2	1.1
Rheumatism, acute and chronic (58, 59)	4.1	3.9	4.1	4.3	4.4
Diseases of the organs of locomotion, except diseases of the joints (156b)	2.9	3.0	3.2	3.0	2.9
Diseases of the skin (151–153)	2.8	2.4	2.6	2.4	2.7
Infectious and parasitic diseases [2] (1–12, 14–24, 26–29, 31, 32, 34–44)	3.2	3.3	3.3	2.9	2.8
All other diseases (45–57, 60–79, 88, 89, 100, 101, 103, 154, 155, 156a, 157, 162)	11.0	7.4	10.7	7.5	7.5
Ill-defined and unknown causes (200)	2.1	2.7	2.1	2.9	2.5
Average number of males covered in the record	260,664	226,685	257,779	222,353	941,091
Number of organizations	21	22	22	22	--------

[1] Industrial injuries, venereal diseases, and a few numerically unimportant causes of disability are not reported.
[2] Except influenza, respiratory tuberculosis, and the venereal diseases.

Second quarter and first half of 1942.—Table 1 shows the number of disabilities per 1,000 industrial workers for the second quarter and first half of the year 1942. An examination of the table reveals that the pneumonia rate for both time periods continues relatively high.

There are in addition two cause groups that show notable increases in frequency. These are, for both the second quarter and first half, diseases of the stomach except cancer, and diarrhea and enteritis. In fact the rates for these two cause groups for the second quarter as well as the first half are the highest recorded for the 10 years 1933–42. The second quarter rate of 4.4 cases per 1,000 workers on account of diseases of the stomach except cancer shows an excess of 16 percent when compared with the mean (3.8) for the past 10 second quarters; for the second half of 1942 the rate is also 4.4 and the corresponding percentage excess is 16 percent. The second quarter rate of 194 : for diarrhea and enteritis is 1.5, which is also the rate for the second half. When these rates are compared with the corresponding means based on the years 1933–42 the percentage excesses are found to be 25 percent and 36 percent for the second quarter and the first half, respectively.

DEATHS DURING WEEK ENDED OCTOBER 10, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 10, 1942	Corresponding week 1941
Data from 87 large cities of the United States:		
Total deaths	8,671	7,757
Average for 3 prior years	7,678	
Total deaths, first 40 weeks of year	332,069	333,577
Deaths per 1,000 population, first 40 weeks of year, annual rate	11.6	11.7
Deaths under 1 year of age	632	553
Average for 3 prior years	516	
Deaths under 1 year of age, first 40 weeks of year	22,696	20,871
Data from industrial insurance companies:		
Policies in force	65,108,967	64,520,321
Number of death claims	10,802	9,924
Death claims per 1,000 policies in force, annual rate	8.7	8.0
Death claims per 1,000 policies, first 40 weeks of year, annual rate	9.2	9.5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED OCTOBER 17, 1942

Summary

Normal seasonal increases were reported for most of the common communicable diseases for which weekly telegraphic reports are received from the State health officers. Of the 9 diseases included in the following tables, however, the incidence of only 3 (influenza, meningococcus meningitis, and scarlet fever) is currently above the 5-year (1937–41) median expectancy. For the year to date, the incidence of only 2 (measles and meningococcus meningitis) is above the 5-year median.

The current incidence of influenza is above that for the corresponding week of each of the 5 preceding years. The excess is restricted to 3 States (Texas 507, South Carolina 263, and Virginia 169), which reported approximately 70 percent of the total of 1,346 cases. For the current week, the incidence of scarlet fever is above the 5-year median. The total this year to date, however, is below the corresponding figure for each of the preceding 5 years.

The incidence of poliomyelitis remained about the same as for the preceding week. The seasonal peak of this disease was apparently reached during the week ended September 12, when 267 cases were reported.

A total of 104 cases of typhus fever was reported, as compared with 88 for the preceding week and 76 for the next earlier week. A total of 2,779 cases has been reported this year to date, as compared with 2,117 cases last year for the same period.

A decline was recorded for the death rate in large cities, as compared with the preceding week, but the rate is still significantly above the 3-year average. The current rate is 11.6 per 1,000 population, as compared with 12.2 for the preceding week and with a 3-year (1939–41) average of 10.7. Owing to the low urban death rate during the first half of the current year, the cumulative rate to date (11.6) is still slightly below that for the same period last year (11.7).

Telegraphic morbidity reports from State health officers for the week ended October 17, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median, 1937-41	Week ended—		Median, 1937-41	Week ended—		Median, 1937-41	Week ended—		Median, 1937-41
	Oct. 17, 1942	Oct. 17, 1941		Oct. 17, 1942	Oct. 18, 1941		Oct. 17, 1942	Oct. 18, 1941		Oct. 17, 1942	Oct. 18, 1941	
NEW ENG.												
Maine	0	0	0	----	----	----	2	31	12	1	0	0
New Hampshire	0	0	0	----	----	----	36	10	10	0	0	0
Vermont	1	0	0	----	----	----	16	1	5	1	0	0
Massachusetts	3	0	1	----	----	----	107	82	43	2	3	2
Rhode Island	2	2	1	----	----	----	4	3	2	2	0	0
Connecticut	2	1	1	6	----	----	3	11	9	1	0	0
MID. ATL.												
New York	18	15	16	[1] 6	[1] 4	[1] 4	66	80	80	5	2	2
New Jersey	1	3	9	11	6	8	19	22	22	3	0	0
Pennsylvania	8	9	20	----	----	----	67	110	110	8	7	3
E. NO. CEN.												
Ohio	18	5	30	15	3	19	19	26	21	0	1	1
Indiana	8	17	18	13	14	13	12	5	11	0	0	0
Illinois	20	20	23	7	9	2	11	29	29	7	1	1
Michigan [2]	12	18	15	1	----	1	23	35	35	2	0	2
Wisconsin	3	1	1	33	16	25	53	51	51	1	0	0
W. NO. CEN.												
Minnesota	5	10	5	----	3	2	7	10	8	0	0	0
Iowa	1	0	5	----	7	----	11	12	12	0	0	0
Missouri	4	11	14	1	----	----	14	9	9	0	2	1
North Dakota	1	1	1	5	----	1	0	37	2	0	0	0
South Dakota	17	8	2	----	----	----	5	0	4	0	0	0
Nebraska	1	7	3	7	----	----	15	4	4	0	0	0
Kansas	6	4	4	5	7	2	6	2	4	1	0	0
SO. ATL.												
Delaware	1	3	1	----	----	----	0	0	1	1	0	0
Maryland [3]	7	7	7	8	1	7	4	11	6	0	3	1
Dist. of Col.	0	2	6	----	----	----	1	4	1	2	0	0
Virginia	30	33	61	169	104	70	5	20	20	1	1	1
West Virginia	11	12	19	1	10	10	2	45	2	1	1	1
North Carolina	78	101	124	1	1	1	2	73	44	0	0	0
South Carolina	37	63	24	263	151	151	6	16	3	0	0	0
Georgia	39	30	48	38	25	16	4	7	3	0	1	1
Florida	10	11	10	1	25	1	1	9	2	0	0	0
E. SO. CEN.												
Kentucky	24	15	20	5	----	3	1	32	19	2	1	1
Tennessee	23	40	34	12	3	16	11	20	6	0	1	1
Alabama	40	29	30	55	18	23	3	9	4	1	1	1
Mississippi [2]	16	11	16	----	----	----	----	0	----	0	0	0
W. SO. CEN.												
Arkansas	17	20	20	16	13	16	5	16	3	1	1	0
Louisiana	14	22	19	3	3	3	0	1	0	0	0	0
Oklahoma	10	13	22	25	35	30	1	11	2	0	0	0
Texas	78	78	58	507	529	210	33	14	17	2	0	1
MOUNTAIN												
Montana	4	5	3	3	2	4	5	8	22	0	0	0
Idaho	0	0	0	3	----	1	14	1	7	0	0	0
Wyoming	0	1	0	8	9	----	7	1	3	0	0	0
Colorado	8	13	10	25	16	7	3	30	13	0	0	0
New Mexico	6	1	1	1	1	----	0	19	7	0	0	0
Arizona	1	2	4	47	51	40	13	10	4	0	0	0
Utah [2]	0	0	1	1	2	1	108	3	6	0	1	0
Nevada	0	0	----	1	----	----	1	0	----	0	0	----
PACIFIC												
Washington	1	0	0	3	----	----	157	6	6	1	0	0
Oregon	3	0	0	8	18	13	59	13	10	1	0	0
California	24	18	23	32	45	14	38	98	48	2	1	1
Total	613	662	753	1,346	1,131	748	980	1,042	1,042	49	28	34
41 weeks	10,537	11,058	16,191	87,214	496,626	164,435	471,849	830,575	352,687	2,782	1,642	1,642

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 17, 1942, and comparison with corresponding week of 1941 and 5-year median—Continued

Division and State	Poliomyelitis: Week ended— Oct. 17, 1942	Poliomyelitis: Week ended— Oct. 18, 1941	Poliomyelitis: Median 1937–41	Scarlet fever: Week ended— Oct. 17, 1942	Scarlet fever: Week ended— Oct. 18, 1941	Scarlet fever: Median 1937–41	Smallpox: Week ended— Oct. 17, 1941	Smallpox: Week ended— Oct. 18, 1942	Smallpox: Median 1937–41	Typhoid and paratyphoid fever: Week ended— Oct. 17, 1942	Typhoid and paratyphoid fever: Week ended— Oct. 18, 1941	Typhoid and paratyphoid fever: Median 1937–41
NEW ENG.												
Maine	4	0	0	6	11	7	0	0	0	0	0	0
New Hampshire	0	2	0	5	28	2	0	0	0	2	3	0
Vermont	0	1	0	8	4	7	0	0	0	0	0	0
Massachusetts	2	7	4	128	94	65	0	0	0	12	0	0
Rhode Island	0	3	1	2	4	4	0	0	0	1	0	0
Connecticut	4	5	4	18	6	20	0	0	0	0	0	1
MID. ATL.												
New York	20	55	20	152	90	123	0	0	0	12	9	14
New Jersey	14	12	10	43	54	48	0	0	0	1	3	3
Pennsylvania	7	30	7	112	89	161	0	0	0	6	17	20
E. NO. CEN.												
Ohio	6	14	14	137	130	171	0	0	0	7	10	9
Indiana	5	1	3	50	81	81	1	1	2	2	2	3
Illinois	22	16	16	145	125	168	0	1	1	22	6	15
Michigan [2]	6	11	13	72	100	147	0	0	0	4	13	7
Wisconsin	2	4	9	109	66	84	0	1	1	2	4	1
W. NO. CEN.												
Minnesota	2	11	18	49	35	46	0	0	0	0	0	0
Iowa	8	4	11	45	43	52	2	0	0	0	5	5
Missouri	1	1	1	44	65	65	0	0	0	3	8	8
North Dakota	1	2	0	1	8	11	0	0	0	0	2	2
South Dakota	1	0	0	19	11	14	0	0	0	0	1	0
Nebraska	15	0	2	25	10	9	0	0	0	0	0	1
Kansas	11	4	4	70	49	62	0	0	0	1	4	4
SO. ATL.												
Delaware	2	0	0	10	6	7	0	0	0	1	0	1
Maryland [2]	0	7	2	26	23	27	0	0	0	1	10	8
Dist. of Col.	0	4	1	15	14	10	0	0	0	2	1	1
Virginia	3	6	2	57	37	37	0	0	0	12	8	10
West Virginia	1	3	2	42	64	64	5	[illegible]	0	3	9	9
North Carolina	2	10	5	113	93	80	1	0	0	3	6	6
South Carolina	2	6	0	12	11	10	0	0	0	2	1	8
Georgia	1	18	1	58	33	33	0	0	0	3	1	8
Florida	0	3	1	3	6	6	0	0	0	1	1	2
E. SO. CEN.												
Kentucky	1	5	5	65	46	56	1	0	0	3	10	14
Tennessee	5	17	2	98	108	52	0	1	1	6	21	15
Alabama	5	22	2	40	52	31	0	0	0	6	2	4
Mississippi [2]	1	6	0	12	14	19	0	1	0	2	4	5
W. SO. CEN.												
Arkansas	3	2	2	23	7	15	3	3	0	7	8	11
Louisiana	3	1	1	12	6	14	0	0	0	7	5	8
Oklahoma	0	0	2	23	14	23	0	1	1	5	6	8
Texas	12	6	7	33	26	40	0	0	0	16	25	27
MOUNTAIN												
Montana	1	1	1	8	12	14	0	0	0	0	1	3
Idaho	0	0	0	0	4	14	1	0	0	0	0	3
Wyoming	0	1	1	1	2	4	0	0	0	1	1	1
Colorado	1	0	6	18	29	20	0	0	1	1	8	8
New Mexico	0	0	2	2	8	8	0	0	0	8	3	7
Arizona	1	0	0	3	2	2	0	0	0	1	0	2
Utah [2]	0	1	2	20	9	9	0	0	0	0	0	0
Nevada	0	0	------	0	0	------	0	0	------	0	0	------
PACIFIC												
Washington	1	1	1	16	25	28	0	0	0	3	2	2
Oregon	0	3	3	4	5	16	0	0	1	0	3	1
California	14	6	10	87	87	89	0	0	1	7	4	12
Total	190	312	312	2,041	1,846	1,985	14	9	15	176	227	291
41 weeks	3,214	7,586	7,586	98,378	98,644	126,278	658	1,193	8,456	5,689	7,165	10,725

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 17, 1942—Continued

Division and State	Whooping cough, Week ended— Oct. 17, 1942	Whooping cough, Week ended— Oct. 18, 1941	Week ended Oct. 17, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	8	9	0	0	0	0	0	0	0	0	0
New Hampshire	8	7	0	0	0	0	0	0	0	0	0
Vermont	28	3	0	0	0	0	0	0	0	0	0
Massachusetts	161	94	0	0	310	0	0	0	0	0	0
Rhode Island	0	22	0	0	0	0	0	0	0	0	0
Connecticut	65	33	0	0	3	0	0	0	0	0	0
MID. ATL.											
New York	352	287	0	4	14	0	2	0	0	0	0
New Jersey	202	143	1	0	0	0	0	0	0	0	0
Pennsylvania	280	233	0	0	1	0	0	0	0	0	0
E. NO. CEN.											
Ohio	139	226	0	0	7	0	0	0	0	0	0
Indiana	49	14	0	0	0	0	0	0	0	0	0
Illinois	173	190	0	1	20	0	0	0	1	0	0
Michigan [3]	210	233	0	0	6	0	0	0	0	0	0
Wisconsin	137	231	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	41	56	0	9	0	0	0	0	0	0	0
Iowa	11	15	0	0	0	0	1	0	0	0	0
Missouri	16	36	0	0	0	1	0	0	0	0	0
North Dakota	11	12	0	0	0	0	3	0	0	0	0
South Dakota	4	10	0	0	0	0	0	0	0	0	0
Nebraska	22	6	0	0	0	0	0	0	0	0	0
Kansas	22	52	0	0	0	0	4	0	0	1	0
SO. ATL.											
Delaware	2	0	0	0	0	0	0	0	0	0	0
Maryland [3]	62	32	0	0	0	10	0	0	0	1	0
Dist. of Col.	0	25	0	0	0	0	0	0	0	0	0
Virginia	29	17	0	2	0	84	0	0	0	0	0
West Virginia	1	16	0	0	0	0	0	0	0	0	0
North Carolina	42	112	0	0	0	0	0	0	1	0	1
South Carolina	14	62	0	0	14	0	0	0	0	0	6
Georgia	14	19	0	2	6	0	0	0	0	1	25
Florida	5	25	0	0	0	0	0	0	0	0	10
E. SO. CEN.											
Kentucky	9	40	0	0	0	7	0	0	0	0	0
Tennessee	34	33	0	0	0	6	0	0	0	0	4
Alabama	15	16	0	0	0	0	1	0	0	0	10
Mississippi [3]	------	0	0	0	0	0	0	0	0	0	2
W. SO. CEN.											
Arkansas	26	15	0	3	4	0	0	0	0	1	2
Louisiana	0	3	0	1	0	0	0	0	0	0	5
Oklahoma	3	11	0	0	0	0	0	0	0	0	0
Texas	124	93	0	25	122	0	1	0	0	0	38
MOUNTAIN											
Montana	53	14	0	0	0	0	0	0	0	0	0
Idaho	0	5	0	0	0	0	0	0	0	0	0
Wyoming	10	3	0	0	0	0	0	0	0	1	0
Colorado	6	69	0	0	4	0	0	0	0	0	0
New Mexico	5	21	0	0	5	0	0	0	0	0	0
Arizona	1	5	0	0	0	16	0	0	0	0	0
Utah [3]	16	18	0	0	0	0	0	0	0	0	0
Nevada	0	5	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	15	43	0	0	1	0	0	0	0	0	0
Oregon	12	34	0	0	0	0	0	0	0	0	0
California	175	181	0	0	9	0	0	0	0	2	1
Total	2,614	2,807	1	47	526	124	12	0	2	7	104
41 weeks	144,350	171,071									

[1] New York City only.
[3] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended October 3, 1942

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	----	0	0	0	1	1	6	0	0	0
Baltimore, Md	3	0	1	0	4	3	10	0	2	0	0	45
Billings, Mont	0	0	----	0	0	0	1	0	0	0	0	0
Birmingham, Ala	0	0	1	0	0	0	0	0	1	0	1	2
Boise, Idaho	0	0	----	0	0	0	0	0	0	0	0	0
Boston, Mass	1	0	----	0	7	1	5	0	25	0	0	35
Bridgeport, Conn	0	0	----	0	0	0	1	0	4	0	1	0
Brunswick, Ga	0	0	----	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	----	2	2	0	7	0	3	0	0	8
Camden, N. J	1	0	----	0	0	0	1	0	1	0	0	7
Charleston, S. C	0	0	1	0	0	0	1	1	0	0	0	0
Charleston, W. Va	0	0	----	0	0	0	0	0	2	0	0	0
Chicago, Ill	7	1	1	0	5	0	28	14	24	0	1	92
Cincinnati, Ohio	2	0	----	0	3	0	2	1	15	0	0	12
Cleveland, Ohio	3	0	5	0	1	0	3	2	18	0	0	31
Columbus, Ohio	0	0	1	1	0	0	1	0	15	0	2	6
Concord, N. H	0	0	----	0	0	0	0	0	1	0	0	0
Cumberland, Md	0	0	----	0	0	0	0	0	0	0	0	0
Dallas, Tex	2	0	----	0	0	0	2	0	8	0	1	5
Denver, Colo	11	0	12	0	2	0	1	1	4	0	1	6
Detroit, Mich	1	0	----	1	9	0	8	6	21	0	1	108
Duluth, Minn	0	0	----	0	0	0	3	0	1	0	0	8
Fall River, Mass	0	0	----	1	2	0	0	0	2	0	0	1
Fargo, N. Dak	0	0	----	0	0	0	0	1	0	0	0	0
Flint, Mich	0	0	----	0	0	0	4	0	0	0	0	4
Fort Wayne, Ind	0	0	----	0	0	0	1	0	0	0	1	0
Frederick, Md	0	0	----	0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	----	0	0	0	2	0	0	0	0	0
Grand Rapids, Mich	0	0	----	1	0	0	1	0	0	0	0	0
Great Falls, Mont	0	0	----	0	0	0	0	0	2	0	0	0
Hartford, Conn	0	0	----	0	1	0	1	2	4	0	0	3
Helena, Mont	0	0	----	0	0	0	0	0	0	0	0	0
Houston, Tex	3	0	----	0	0	0	8	0	1	0	1	2
Indianapolis, Ind	1	0	----	0	1	0	6	0	10	0	0	13
Kansas City, Mo	0	0	----	0	1	1	1	1	10	0	1	0
Kenosha, Wis	0	0	----	0	1	0	0	0	8	0	0	3
Los Angeles, Calif	6	0	10	0	7	1	11	7	10	0	0	13
Lynchburg, Va	0	0	----	0	0	0	1	0	2	0	0	2
Memphis, Tenn	0	0	2	0	0	0	2	0	6	0	0	14
Milwaukee, Wis	0	0	----	0	10	0	0	1	6	0	1	42
Minneapolis, Minn	0	0	----	1	1	0	1	1	13	0	0	7
Missoula, Mont	0	0	----	0	0	0	0	0	0	0	1	0
Mobile, Ala	2	0	----	0	0	0	1	0	1	0	0	0
Nashville, Tenn	1	0	----	0	0	0	3	0	1	0	0	0
Newark, N. J	0	0	----	0	1	2	4	1	3	0	1	19
New Haven, Conn	0	0	----	0	0	0	1	0	5	0	0	2
New Orleans, La	0	0	2	1	0	0	11	0	4	0	0	1
New York, N. Y	9	2	6	1	4	4	40	4	42	0	5	123
Omaha, Nebr	1	0	----	0	0	0	0	0	3	0	0	6
Philadelphia, Pa	1	0	----	0	29	3	14	0	21	0	4	114
Pittsburgh, Pa	0	0	4	4	0	0	11	0	4	0	0	5
Portland, Maine	0	0	----	0	0	0	1	0	1	0	0	12
Providence, R. I	4	0	----	0	4	0	0	0	2	0	0	24
Pueblo, Colo	0	0	----	0	0	0	2	0	1	0	0	0
Racine, Wis	0	0	----	0	0	0	0	0	3	0	0	0
Raleigh, N. C	0	0	----	0	1	0	2	0	0	0	0	4
Reading, Pa	0	0	----	1	0	0	1	0	0	0	0	1
Richmond, Va	0	0	----	0	0	0	0	0	6	0	0	12

City reports for week ended October 3, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va	0	0	--	0	0	0	0	0	0	0	0	0
Rochester, N. Y	0	0	-----	0	2	0	2	0	3	0	1	10
Sacramento, Calif	2	0	--	0	1	0	2	0	3	0	0	4
St. Joseph, Mo	0	0		0	0	0	1	0	0	0	0	0
St. Louis, Mo	0	1	2	1	2	0	5	1	5	0	0	2
St. Paul, Minn	0	0	---	0	0	0	4	1	3	0	0	13
Salt Lake City, Utah	0	0	---	0	15	0	2	0	1	0	2	2
San Antonio, Tex	1	0	1	0	0	0	1	1	1	0	0	1
San Francisco, Calif	1	0		0	12	0	3	0	6	0	1	4
Savannah, Ga	0	0	3	2	0	0	1	0	0	0	0	1
Seattle, Wash	3	0	-	1	2	0	2	0	0	0	0	4
Shreveport, La	4	0	---	1	0	0	6	0	2	0	1	0
South Bend, Ind	0	0	----	0	0	0	0	0	0	0	0	1
Spokane, Wash	0	0	--	0	10	1	2	0	7	0	0	5
Springfield, Mass	0	0	---	0	0	0	1	0	20	0	0	0
Superior, Wis	0	0	------	0	0	0	0	0	1	0	0	0
Syracuse, N. Y	0	0	-----	0	0	2	2	1	2	0	0	15
Tacoma, Wash	0	0	-----	1	9	0	0	0	1	0	0	1
Tampa, Fla	0	0	-----	0	0	0	1	0	0	0	0	0
Terre Haute, Ind	1	0	------	0	0	0	1	0	0	0	0	1
Topeka, Kans	0	0	-----	0	0	0	1	0	1	0	0	0
Trenton, N. J	0	0	----	0	0	0	3	0	3	0	0	9
Washington, D. C	1	0	--	0	0	0	5	0	14	0	[illegible]	6
Wheeling, W. Va	0	0	-	0	1	1	0	0	0	0	0	3
Wichita, Kans	0	0	--	0	1	0	1	0	3	0	0	0
Wilmington, Del	0	0	--	0	0	0	1	2	1	0	0	0
Wilmington, N. C	0	0	-----	0	1	0	1	0	1	0	0	0
Winston-Salem, N. C	0	0	-----	0	0	0	1	0	5	0	0	0
Worcester, Mass	0	0	-	0	1	0	6	0	9	0	0	28

Dysentery, amebic—Cases: Los Angeles, 1; New York, 1.

Dysentery, bacillary—Cases: Baltimore, 11; Chicago, 13; Los Angeles, 1; Missoula, 1; Nashville, 2; Newark, 1; New York, 46; Richmond, 4; Rochester, 1.

Typhus fever—Cases: Birmingham, 1; Charleston, S. C., 4; New Orleans, 1; Savannah, 4; Shreveport, 1

Rates (annual basis) per 100,000 population, for the group of 87 cities in the preceding table (estimated population, 1942, 33,957,450)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Week ended Oct. 3, 1942	11.06	7.98	3.07	23.49	39.92	63.42	0.00	4.30	137.28
Average for week 1937-41	14.28	8.07	1.86	[1] 30.11	45.62	59.12	0.31	8.07	162.63

[1] Median.

PLAGUE INFECTION IN CALIFORNIA

Under date of October 9, 1942, plague infection was reported proved in specimens collected in California as follows:

Kern County: In a pool of 200 fleas from 27 ground squirrels, *C. beecheyi*, taken within 1 mile south of Tejon school.

Mono County: September 4, in a pool of 47 fleas from 7 ground squirrels, *C. fisheri*, taken one-half mile east of Mammoth Post Office;

September 8, in pools of 33 fleas from 9 ground squirrels, *C. beldingi*, taken from Convict Lake, 7 miles north of Mammoth Post Office, and 68 fleas from 17 golden mantled ground squirrels, *C. lateralis* sp., taken 1 mile south and 2 miles west of Mammoth Post Office; September 9, in tissue from 1 chipmunk, *Eutamias* sp., found dead 1 mile east and 4 miles south of June Lake.

Siskiyou County: In pools of fleas from ground squirrels, *C. douglasii*, as follows: September 14, 119 fleas from 4 squirrels taken two and one-half miles east of Gazelle; September 16, 113 fleas from 15 squirrels taken 6 miles north of Gazelle; September 17, 132 fleas from 16 squirrels taken 12 miles north of Weed; September 18, 152 fleas from 6 squirrels taken 1 mile south of Edgewood.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—During the week ended September 26, 1942, 1 rat found in Paauhau area, Hamakua District, Island of Hawaii, T. H., has been proved positive for plague.

FOREIGN REPORTS

CANADA

Provinces — Communicable diseases — Week ended September 19, 1942.—During the week ended September 19, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		2	1	4	6		1		1	15
Chickenpox		2		21	63	10	17	9	25	147
Diphtheria	1	16	1	21	2	11		1		53
Dysentery				32						32
Encephalomyelitis								1		1
German measles		1		2	2			3	3	11
Influenza		2			3	2				7
Measles				15	14	9	6	1	4	49
Mumps		8		34	111	11	20	8	71	263
Pneumonia		1			3				[illegible]	22
Poliomyelitis	1	17	7	12	[illegible]	1	1		4	52
Scarlet fever		8	6	68	48	10	20	20	25	205
Trachoma									1	1
Tuberculosis	1	10	17	110	41	35	24	26	39	303
Typhoid and paratyphoid fever			2	24	2	5	1			34
Undulant fever				1	1				2	4
Whooping cough		1		254	90	4	13	11	13	386
Other communicable diseases		9		6	267	61	2		1	346

CUBA

Provinces—Notifiable diseases—4 weeks ended September 12, 1942.—During the 4 weeks ended September 12, 1942, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1	1	1	8	2	11	24
Diphtheria	2	19	4	1	1	3	30
Hookworm disease		15				1	16
Leprosy			1			3	4
Malaria	44	12		10		150	216
Measles		16	4			21	41
Poliomyelitis	2	17	1	3	5	11	39
Scarlet fever		3					3
Tuberculosis	18	31	33	54	5	73	214
Typhoid fever	11	51	11	39	3	23	138
Whooping cough		1					1
Yaws						5	5

[1] Includes the city of Habana.

FINLAND

Communicable diseases—June 1942.—During the month of June 1942, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	138	Poliomyelitis	3
Dysentery	1	Scarlet fever	306
Influenza	617	Typhoid fever	226
Paratyphoid fever	107		

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Typhus Fever

Algeria.—During the period August 21–31, 1942, 205 cases of typhus fever were reported in Algeria.

Hungary.—During the week ended September 19, 1942, 8 cases of typhus fever were reported in Hungary.

Morocco.—During the week ended September 19, 1942, 26 cases of typhus fever were reported in Morocco.

Tunisia.—During the period September 1–10, 1942, 1,333 cases of typhus fever were reported in Tunisia, as compared with 101 cases reported during the preceding 10-day period.

Turkey.—During the week ended September 26, 1942, 8 cases of typhus fever were reported in Turkey.

COURT DECISION ON PUBLIC HEALTH

Natural milkshed statutory definition construed.—(Connecticut Supreme Court of Errors; *Bryant & Chapman Co.* v. *Lowell, Dairy and Food Com'r*, 27 A.2d 637; decided July 16, 1942.) A statute defined the natural milkshed of Connecticut as embracing the State itself and "that area or areas adjacent to the State in which fresh milk for daily use in Connecticut is produced, or may be produced, and which gradually expands or contracts over a contiguous milk producing area in accordance with the operation of the law of supply and demand." By the statute dairy farms located in the natural milkshed and outside

the boundaries of the State, and producing fresh milk for daily use in the State, were subject to the same registration, inspection, and approval as dairy farms in the State and producing milk for sale in the State. The State dairy and food commissioner was forbidden to inspect dairy farms for the production of milk which were located beyond the natural milkshed of the State except in the event of (*a*) a milk shortage in the State milkshed or (*b*) an emergency. Certain dairies in New York in an area adjacent to the New York-Connecticut State line had registered with the defendant dairy and food commissioner and had been inspected by the defendant at State expense pursuant to the provisions of the above-mentioned statute. These dairies, whose location was such that they could supply fresh milk for daily use in Connecticut, were found upon inspection to comply with the Connecticut standards of sanitation and public health, but the defendant refused to approve them as a source of milk supply for daily use as fresh milk in Connecticut because he found that there was no shortage of milk in the State milkshed, that no emergency existed, and that the "dairies were beyond the natural milkshed."

In a mandamus action against the commissioner the Connecticut Supreme Court of Errors was of the view that the part of the statutory definition of the natural milkshed of the State which referred to an area adjacent to the State "in which fresh milk for daily use in Connecticut is produced, or may be produced" presented a comparatively simple question of fact. "Can the milk be preserved and transported to Connecticut in time to be usable as fresh milk?" With respect to the additional qualification that such area "gradually expands or contracts over a contiguous milk producing area in accordance with the operation of the law of supply and demand," the court said that the qualification was merely descriptive, that it added nothing to and subtracted nothing from the definition, and that it could be disregarded. "The apparent purpose of the clause under consideration was to make it clear that the area of the natural milkshed was not one which was fixed as of any particular time but was one which would fluctuate from time to time in accordance with the law of supply and demand." According to the court the facts stipulated brought the dairies involved in the instant case squarely within the statutory definition of the natural milk shed as interpreted above.

The court also rejected the defendant's claim that it was the legislature's intention to delegate to him the authority to define the boundary of the natural milkshed in accordance with the operation of the law of supply and demand and that before he could find out-of-State dairies within the natural milkshed he first had to find that a shortage or emergency existed in Connecticut. That intention, said the court,

was not expressed and could not be implied from the vague qualification of the definition of the natural milkshed. It was pointed out that the defendant commissioner, under his own construction of the statutory definition, had found that the dairies in the instant case were in the natural milkshed because he, although finding that there was no shortage and no emergency, had inspected the dairies at State expense. The court said that it could not be assumed that he would act in direct contravention of the expressed direction of the statute that he "shall not inspect dairy farms for the production of milk which are located beyond the natural milkshed of this State except in the event of a milk shortage in such State milkshed, or in the event of an emergency."

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UNITED STATES PUBLIC HEALTH SERVICE

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VARIATION IN HOSPITALIZATION WITH SIZE OF CITY, FAMILY INCOME, AND OTHER ENVIRONMENTAL FACTORS

Based on Records for 9,000 families in 18 States Visited Periodically for 12 months, 1928–31 [1]

By SELWYN D. COLLINS, *Principal Statistician, United States Public Health Service*

CONTENTS

The great majority of the large hospitals of the United States are located in cities. Thus hospital care is less readily accessible in rural areas because of fewer beds, greater distances, and poorer roads. The ability to pay for service is another important consideration; in large cities a certain amount of free or nearly free hospital care is usually obtainable for families with low incomes, but this is seldom true in small towns and rural areas. That greater hospital facilities available at reasonable costs would lead to more hospital care in rural areas is suggested by the high rates among persons entitled to free service; for example, the American Indians who live under extremely rural conditions but receive free medical care from the Federal Government have hospital admission rates that are 4 or 5 times those for families

[1] From General Morbidity Studies, Division of Public Health Methods, National Institute of Health. This is the nineteenth of a series of papers on sickness and medical care in this group of families (*1–18*). The survey of these families was organized and conducted by the Committee on the Costs of Medical Care; the tabulation was done under a cooperative arrangement between the Committee and the Public Health Service. Committee publications based on the results deal primarily with costs and Public Health Service publications primarily with the incidence of illness and the extent and kind of medical care, without regard to cost. As costs are meaningless without some knowledge of the extent and nature of the service received, there is inevitably some overlapping. The Committee staff, particularly Dr. I. S. Falk and Miss Margaret Klem, cooperated in the tabulation of the data.

in small towns and rural areas in the present study (*26*). Moreover, the residents of large cities in this study had admission rates that were about 60 percent higher than those for rural areas. City dwellers with hospital insurance have still higher rates (*27*).

The variation in hospitalization in urban and rural areas is the primary concern of this paper, but family income and the availability of hospital facilities are intimately related to that subject. The measures of the extent of hospitalization here used include hospital admissions and days of care per 1,000 population and the percentage of illnesses of certain categories that were hospitalized.

I. SOURCE AND CHARACTER OF DATA

In the study of illness in a group of families in 18 States[2] that was made by the Committee on the Costs of Medical Care (*21*) and the United States Public Health Service, the record for each illness included a statement of any hospital care received during the study year.

The composition and characteristics of the group of 8,758 white families which were kept under observation for 12 consecutive months in the years 1928–31 have been considered in some detail in the first report in the series (*1*). These families, including a total of 39,185 individuals, resided in 130 localities in 18 States representing all geographic sections. Every size of community was included, from metropolitan districts to small industrial and agricultural towns and rural unincorporated areas.[3] With respect to income, the distribution was reasonably similar to the estimated distribution of the general population of the United States at the time of the survey.

Each family was visited at intervals of 2 to 4 months for a period long enough to obtain a sickness record for 12 consecutive months. On the first call a record was made of the number of members of the household, together with sex, age, and other facts about each person. On succeeding visits the canvasser recorded all illness that had occurred since the preceding call, with such pertinent facts about each case as the date of onset, the duration in terms of the presence of symptoms, of inability to pursue usual activities (disability), of days confined to bed, and of days confined to a hospital, with the type of hospital furnishing the service. Records for persons who were still sick at the preceding visit were brought up to date and when completed the termination of the case was entered. Thus there are available for an observed population which may be classified by size of city of resi-

[2] The 18 States sampled and the number of canvassed families were as follows: California (890), Colorado (386), Connecticut (100), District of Columbia (99), Georgia (544), Illinois (468), Indiana (494), Kansas (301), Massachusetts (287), Michigan (329), Minnesota (224), New York (1710), Ohio (1148), Tennessee (212), Virginia (412), Washington (551), West Virginia (318), Wisconsin (290). Further details about the distribution of the canvassed population are included in a preceding paper (*1*).

[3] Every community that was included in the study had either a local health department or some other organization employing a visiting nurse or both; therefore, the most rural areas with no organized community services are not represented.

dence and by family income, the number and proportion of illnesses that were hospitalized and the days spent in a hospital.

Definition of illness and hospital care as recorded in survey.—An illness, for the purpose of this study, was defined as any symptom, disorder, or affection which persisted for 1 or more days or for which medical service[4] was received or medicine purchased. Illness included the results of both disease and injury. What was actually included as illness, however, was necessarily influenced not only by the informant's conception of sickness but also by her memory. With visits as infrequent as 2 to 4 months, it was inevitable that many of the unattended nondisabling illnesses would be terminated and forgotten before the next visit of the enumerator.

A case of illness was considered as hospitalized if the patient stayed in the hospital for 1 or more days including any that stayed over night and a few that did not stay over night but were there for a sufficient part of a day to have been assigned a bed. Newborn infants were not counted as admissions unless they were reported as sick.

The relatively few but long cases in mental and other resident institutions which are largely unreported in family surveys[5] add little to the admission rate but greatly increase the days of hospital care. Since the incompleteness in the family reports of patients in such institutions may vary with size of city and family income, the data in this paper are exclusive of cases in hospitals for mental diseases, tuberculosis, and the resident care of other chronic diseases. Thus the present study is limited to such hospitals as general, women's, children's, eye-ear-nose-throat, and communicable or isolation—all devoted to the care of more or less temporary illness. This procedure omits a few short cases in resident institutions and retains a few long ones in general hospitals but mainly eliminates the long chronic cases. In relatively small groups such as the urban and rural in the present study, it is impossible to get stability in such items as days per 1,000 population and days per case because the study includes so few long cases. It would take a much larger study to obtain stable rates when the long cases are included.

In computing hospital admissions per 1,000 population, illnesses that originated prior to but were in the hospital during the study year are included, along with cases having their onset within the period of observation; the inclusion of the illnesses with prior onset seemed necessary to give proper representation to chronic ailments. The only date available was the onset of symptoms (nondisabling or disabling); therefore, prior onset does not necessarily mean prior hospitalization

[4] Exclusive of dental services, eye refractions, immunizations, and health examinations rendered when no symptoms were present.

[5] See preceding papers (14, 18) for discussion of family sickness surveys in relation to patients in resident hospitals and institutions

Seven percent of all illnesses and 11 percent of hospitalized illnesses (including the few reported as in resident institutions) had their onset of symptoms prior to the study year; the percentage of cases actually hospitalized prior to the study year was presumably much smaller.

Hospital days refer in all instances to those *within the 12-month study period.* In computing average days per case, both complete and incomplete cases are included as cases but the days refer to those within the study year only. Hospital cases with an unknown number of days were put in at the average hospital days per case of the same diagnosis, exclusive of cases hospitalized throughout the year and of a few other exceptionally long cases.

Classification of causes of illness.—The diagnosis as reported by the family informant was submitted to the attending physician for confirmation or correction and his diagnosis substituted for the one given by the family. While reports could not be obtained from all attending physicians, the replies indicated that the housewife usually reported with reasonable accuracy the diagnosis which the physician had given to the family.[6]

Considering an illness in the sense of a continuous period of sickness, only 4.3 percent of all illnesses and 11.2 percent of hospitalized illnesses were designated as due to more than one cause. In general, the more important or more serious cause was assigned as primary, except where a disease like pneumonia is commonly recognized as following measles or influenza, in which case the antecedent condition was taken as primary.[7] In the present paper only five important diagnoses are shown separately and they refer always to the sole or primary diagnosis of the illness.

II. HOSPITALIZATION OF ILLNESS FROM ALL CAUSES

Size of city.—Families living in rural unincorporated areas had a hospital admission rate for the year of 42 cases per 1,000 population (age adjusted), as compared with 68 among those living in cities of 100,000 or over. The two middle groups of towns under 5,000 and cities of 5,000 to 100,000 population fall between these two extremes (fig. 1). When the cases are subdivided into surgical and nonsurgical, each category shows a fairly consistent increase in hospital admission rates as size of city increases; cases treated surgically range from 25 per 1,000 for rural areas to 43 for large cities; and nonsurgical cases range from 17 to 25 per 1,000 for the same two groups.

Admission rates have been plotted by age in figure 2 for the two extreme groups, rural areas and cities of 100,000 and over; it is here

[6] See comparison of diagnoses reported by families and by physicians in the Health Survey of 1935–36 (23, table 2)

[7] Further details on the method of classifying the causes of illness are included in the first report in the series (1).

TABLE 1.—*Frequency at specific ages of surgical and nonsurgical hospital cases*[1] *for all causes in cities of different sizes and in rural areas—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

Size of city	All ages[2]: Number of cases	All ages[2]: Adjusted rate[3]	Age: Under 5	5–9	10–14	15–19	20–24	25–34	35–44	45–54	55 and over
		Hospital cases[1] per 1,000 population during year									
All cases:											
Cities of 100,000 or over	976	67.5	61.7	70.2	49.4	50.2	84.1	94.2	69.1	51.2	66.2
Cities 5,000–100,000	635	66.0	47.6	83.7	45.2	50.1	95.1	88.7	71.4	42.3	48.5
Towns under 5,000	379	50.6	43.2	38.4	36.3	40.3	86.4	89.4	51.1	38.3	30.5
Rural areas	278	42.0	32.9	36.9	36.9	26.3	49.1	80.8	35.7	31.2	42.2
Surgical cases:											
Cities of 100,000 or over	630	42.6	42.3	57.2	41.8	32.8	40.3	46.9	47.8	28.0	43.0
Cities 5,000–100,000	403	40.1	35.2	79.2	39.8	34.3	43.6	37.7	39.7	24.9	28.3
Towns under 5,000	240	30.5	24.7	36.7	29.7	29.8	47.4	42.9	28.2	27.1	21.0
Rural areas	179	25.5	23.8	27.9	31.8	19.0	23.3	40.4	20.4	23.8	20.2
Nonsurgical cases:											
Cities of 100,000 or over	346	24.9	19.4	13.0	7.6	17.4	43.8	47.3	21.3	23.2	23.2
Cities 5,000–100,000	232	25.9	12.4	14.5	5.4	15.8	51.5	51.0	31.7	17.4	20.2
Towns under 5,000	139	20.1	18.5	1.7	6.6	10.5	39.0	46.5	22.9	11.2	9.5
Rural areas	99	16.6	9.1	9.0	5.1	7.3	25.8	40.4	15.3	7.4	22.0
	Population (years of life)										
Cities of 100,000 or over	14,351		1,963	1,994	1,578	1,037	868	2,369	2,303	1,248	907
Cities of 5,000–100,000	9,694		1,535	1,517	1,106	758	505	1,432	1,512	803	495
Towns under 5,000	7,585		1,134	1,199	909	570	359	1,096	1,134	627	524
Rural areas	6,914		881	1,005	975	685	387	743	981	673	545

[1] Exclusive of cases in mental and tuberculosis hospitals and in resident institutions for the care of other chronic diseases.
[2] All ages includes a few of unknown age.
[3] Rates adjusted by the *indirect* method as described in note 3 of table 2.

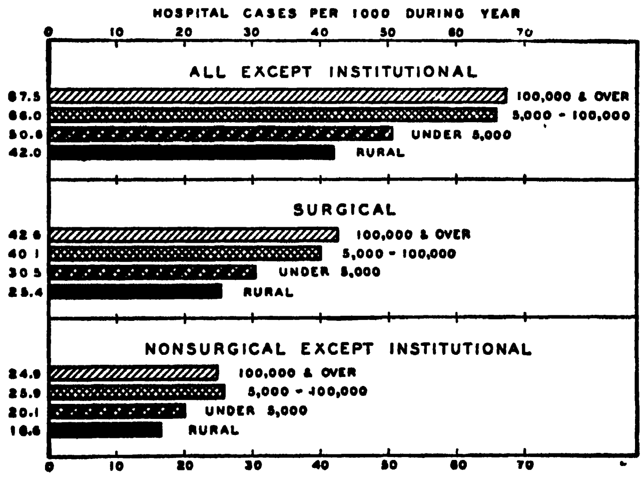

FIGURE 1.—Annual frequency of hospital admissions among persons of all ages in cities of different sizes and in rural areas—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Age adjusted rates including all except cases in mental, tuberculosis, and other hospitals for the resident care of chronic diseases.)

TABLE 2.—*Hospitalization for all causes*[1] *in cities of different sizes and in rural areas—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

Size of city	All ages[2]					Age					
	Number of cases or days		Adjusted[3] rate			Under 20		20–44		45 and over	
	Surgical	Nonsurgical	Total	Surgical	Nonsurgical	Surgical	Nonsurgical	Surgical	Nonsurgical	Surgical	Nonsurgical
			Hospital cases[1] per 1,000 population during year								
Cities of 100,000 or over	630	346	67.5	42.6	24.9	45.2	14.3	46.2	35.9	34.3	23.2
Cities 5,000–100,000	403	232	66.0	40.1	25.9	46.6	12.0	39.4	42.6	26.2	18.5
Towns under 5,000	240	139	50.6	30.5	20.1	30.4	9.2	37.1	35.1	24.3	10.4
Rural areas	179	99	42.0	25.4	16.6	26.2	7.6	27.9	26.1	22.2	14.0
			Annual hospital days[1] per 1,000 population								
Cities of 100,000 or over	6,073	5,468	858	470	388	217	294	570	453	678	460
Cities 5,000–100,000	2,858	3,313	703	347	357	191	271	391	485	405	218
Towns under 5,000	2,493	2,004	649	372	276	236	152	409	512	466	81
Rural areas	1,548	1,582	505	253	252	125	170	318	315	355	259
			Percentage of all cases that were hospitalized								
Cities of 100,000 or over	1,014	10,482	8.5	62.1	3.3	57.2	1.8	67.9	5.6	64.9	3.1
Cities 5,000–100,000	665	8,049	7.3	60.6	2.9	60.6	1.4	60.7	5.4	57.6	2.4
Towns under 5,000	428	6,671	5.3	56.1	2.1	48.9	1.0	65.3	4.3	63.6	1.2
Rural areas	332	5,022	5.2	53.9	2.0	50.8	1.0	57.3	3.9	58.7	1.9
			Percentage of disabling cases that were hospitalized								
Cities of 100,000 or over	872	6,201	13.8	72.2	5.6	68.1	2.7	75.5	10.3	80.4	6.2
Cities 5,000–100,000	537	4,769	12.0	75.0	4.9	75.6	2.2	73.9	9.4	73.9	4.7
Towns under 5,000	362	3,904	8.9	66.3	3.6	59.8	1.6	72.7	7.8	77.8	2.4
Rural areas	292	2,861	8.8	61.3	3.5	57.4	1.6	63.4	7.3	73.0	3.7
			Hospital days per hospital case								
Cities of 100,000 or over	630	346	11.8	9.6	15.8	4.8	20.5	12.2	12.6	19.8	19.8
Cities 5,000–100,000	403	232	9.7	7.1	14.3	4.1	22.6	9.9	11.4	15.5	11.8
Towns under 5,000	240	139	11.9	10.4	14.4	7.7	16.6	11.0	14.6	19.1	7.7
Rural areas	179	99	11.3	8.6	16.0	4.8	22.3	11.4	12.1	16.0	18.5
			Population (years of life)								
Cities of 100,000 or over	------	------	14,351			6,572		5,540		2,155	
Cities 5,000–100,000	------	------	9,694			4,916		3,449		1,298	
Towns under 5,000	------	------	7,585			3,812		2,589		1,151	
Rural areas	------	------	6,914			3,546		2,111		1,218	

[1] Exclusive of cases in mental and tuberculosis hospitals and in resident institutions for the care of other chronic diseases.

[2] All ages includes a few of unknown age.

[3] Rates per 1,000 for all ages are adjusted by the *indirect* method to the age distribution of the white population of the registration States in 1930. Briefly this method involves the following steps: Age specific rates like those in table 1 of a preceding paper (*18*) for the whole canvassed population are used as "standard rates" and multiplied by the canvassed population of specific ages for a given subgroup (for example, cities over 100,000) to obtain expected numbers of cases for the computation of an expected rate for all ages; when this rate is related to the corresponding adjusted rate for the whole canvassed group (adjustment there was by direct method), one obtains an "adjustment factor" which is of the nature of a percentage correction for differences in age distribution. This adjustment or correction factor is applied to the crude rate in the particular subgroup (for example, cities over 100,000) to obtain the adjusted rate. The details of the process are given under the heading "standardized death rates" in Pearl (*22*, pp. 265–269).

Days per case and percentages of cases are not adjusted in any way.

seen that for each of the nine age groups for both surgical and nonsurgical cases, rural areas show lower hospital admission rates than large cities. The two intermediate classes of towns and small cities do not always fall consistently between these two extremes (table 1), but when tabulated in three broad age groups (table 2) the increases in hospital admissions with size of city are reasonably consistent.

An examination of table 2 indicates that the increase in hospitalization with size of city is true not only as measured in admission rates but also in days of hospital care per 1,000 population. Considering all ages, there is a consistent rise with size of city for surgical, nonsurgical, and total days of hospital care per 1,000 population, except

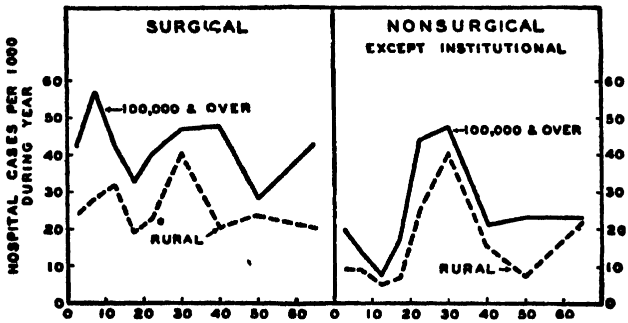

FIGURE 2.—Annual frequency of hospital admissions among persons of specific ages in large cities and in rural areas—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Includes all except cases in mental, tuberculosis, and other hospitals for the resident care of chronic diseases.)

that days on surgical cases in towns under 5,000 is more than for cities of 5,000 to 100,000.

Table 2 also shows the proportion of cases that were hospitalized; since this percentage is so much higher for surgical than nonsurgical cases, the two types are shown separately. The proportion of all surgical cases (all ages) that were hospitalized varies from 54 percent in rural areas to 62 in cities over 100,000, with the two intermediate city-size groups falling between these extremes. While only 2 or 3 percent of the nonsurgical cases were hospitalized, the proportion shows a similarly consistent rise from 2.0 for rural areas to 3.3 percent for large cities.

If the nondisabling cases are excluded and the proportion of disabling cases that were hospitalized is computed, the increase with size of city shows approximately the same picture; the only irregularity in the percentages for all ages is a slightly smaller proportion of surgical disabling cases hospitalized in large (100,000 or over) than in small (5,000–100,000) cities.

The proportions of cases hospitalized among persons in the three broad age groups are somewhat irregular and inconsistent. How-

ever, if the percentages for small towns and rural areas are averaged and compared with similar averages for large and small cities, the results show consistently higher proportions of illnesses hospitalized in urban than in rural places for both surgical and nonsurgical cases.

Data are available from the Health Survey of 1935–36 (*19*) on the percentage of severe cases (disabling for 7 consecutive days or longer) that were hospitalized. The proportion increases definitely with size of city; 19 percent of the cases among residents of cities under 25,000 were hospitalized; 23 percent for cities of 25,000 to 100,000; and 30 percent among residents of cities over 100,000 in population. In five widely separated groups of rural counties, the towns and villages of less than 2,500 population all showed lower percentages of cases hospitalized than any of the above figures for cities, ranging from 7.6 to 17.2 percent. In each of the five localities the percentage of cases hospitalized among persons living in rural areas outside of the villages was less than in the villages, ranging from 5.7 to 15.5 percent. It must be remembered that the percentages quoted from the Health Survey refer to cases that disabled for 7 consecutive days or longer and would be expected to be larger than those in the present study which includes nondisabling cases and those that disabled for 1 day or longer. It is seen, however, that the Health Survey data are in agreement with the data of this study in that the percentage of cases hospitalized increases definitely with size of city.

The United States Bureau of the Census has published statistics on the proportion of deaths in the United States that occur in hospitals. In 1937, the first year for which data of this kind are available for residents of urban and rural areas, 26 percent of the deaths among persons living in towns under 10,000 and rural areas occurred in hospitals, as compared with 47 percent[8] among persons residing in cities of 10,000 population or more (*25*, p. 10). In the present study 8.9 percent of the *disabling* cases among residents of towns under 5,000 and rural areas were hospitalized as compared with 13.0 percent in cities of 5,000 population or more; corresponding figures on the proportion of *all* cases that were hospitalized were 5.3 percent for towns under 5,000 and rural areas, and 8.0 percent for residents of cities over 5,000. Thus in terms of the proportion of fatal cases that were hospitalized, the data for the country as a whole indicate definitely more hospitalization in urban than in rural areas, and the data of this study for nonfatal cases are in agreement with that finding.

Family income.—Hospital admission rates per 1,000 are shown in figure 3 for persons of different income levels. Considering persons of all ages and surgical and nonsurgical cases combined, the rates

[8] The percentages for deaths include those in mental hospitals (2.9 percent of all deaths), tuberculosis hospitals (0.9 percent), and those in penal institutions and homes for the blind, deaf, and aged (2.5 percent). The percentages for survey cases exclude all admissions to these types of institutions because of the incompleteness in recording cases in resident hospitals by the family survey method.

(adjusted) rise with income except for a higher rate in the lowest than in the next higher income group. Most of the variation with income is accounted for by surgical cases, the differences in nonsurgical rates being very small.

In hospital days per 1,000 the lowest and highest income groups have higher rates than the three intervening classes. Hospital days per admission were rather consistently highest for the lowest income group (table 3).

Size of city and family income.—There is considerable correlation between size of city and family income; that is, incomes tend to be higher in large cities and lower in the country. Thus the lower income groups are rather largely rural and higher income groups tend

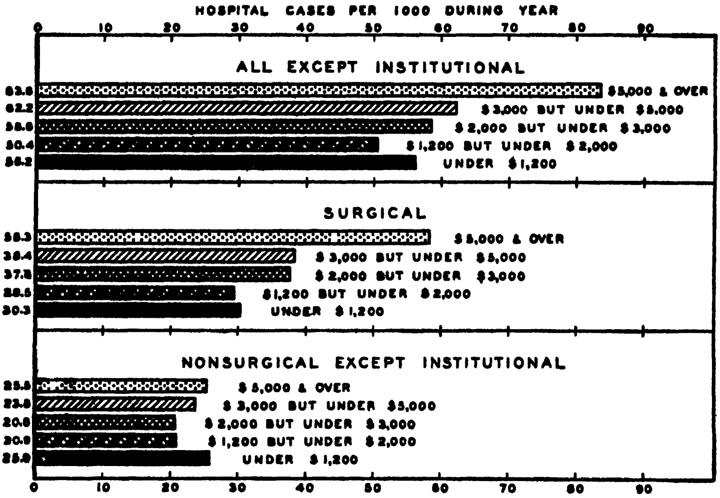

FIGURE 3.—Annual frequency of hospital admissions among persons of all ages in families of different annual income levels—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Age adjusted rates including all except cases in mental, tuberculosis, and other hospitals for the resident care of chronic diseases.)

to be urban. Therefore, the two factors of size of city and family income should be considered simultaneously in relation to hospitalization.

Hospital admission rates are shown in figure 4 for persons of given income levels living in (a) towns and rural areas, (b) small cities, and (c) large cities. It is seen here that in every income group hospital admission rates per 1,000 population of all ages (adjusted) are higher for persons living in cities over 100,000 than in towns under 5,000 and rural areas; the rate for small cities is usually between those for rural areas and large cities. The same statements are true of days of hospital care per 1,000 population (table 4). Thus it appears that among families of the same income level, dwellers in large cities are

TABLE 3.—*Hospitalization for all causes*[1] *among canvassed white families of different income levels in 18 States during 12 consecutive months, 1928–31*

Annual family income	All ages[2]: Number of cases or days: Surgical	All ages[2]: Number of cases or days: Nonsurgical	All ages[2]: Adjusted[3] rate: Total	All ages[2]: Adjusted[3] rate: Surgical	All ages[2]: Adjusted[3] rate: Nonsurgical	Age: Under 20: Surgical	Age: Under 20: Nonsurgical	Age: 20–44: Surgical	Age: 20–44: Nonsurgical	Age: 45 and over: Surgical	Age: 45 and over: Nonsurgical
			Hospital cases[1] per 1,000 population during year								
Under $1,200	186	132	56.2	30.3	25.9	35.0	12.7	33.0	45.5	20.1	12.3
$1,200 but under $2,000	416	263	50.4	29.5	20.9	31.3	11.7	33.8	32.6	20.1	14.4
$2,000 but under $3,000	369	185	58.6	37.8	20.8	37.8	8.0	43.8	35.1	30.0	16.9
$3,000 but under $5,000	192	112	62.2	38.4	23.8	41.3	14.1	42.3	33.8	28.1	21.1
$5,000 and over	268	111	83.8	58.3	25.5	70.8	13.7	52.7	34.7	40.7	24.3
			Annual hospital days[1] per 1,000 population								
Under $1,200	2,549	2,391	938	503	435	301	321	611	698	568	165
$1,200 but under $2,000	3,377	4,200	622	300	322	113	223	394	439	405	316
$2,000 but under $3,000	3,103	2,606	657	372	285	195	181	467	340	422	427
$3,000 but under $5,000	1,378	1,465	614	304	310	173	273	319	397	475	152
$5,000 and over	2,385	1,523	880	530	350	349	252	566	429	680	301
			Percentage of all cases that were hospitalized								
Under $1,200	298	4,287	6.9	62.4	3.1	60.1	1.7	73.4	6.6	50.0	1.4
$1,200 but under $2,000	733	9,961	6.3	56.8	2.6	53.3	1.5	61.1	4.7	59.3	2.2
$2,000 but under $3,000	651	7,160	7.1	57.7	2.6	50.0	1.0	66.0	5.2	59.1	2.4
$3,000 but under $5,000	314	3,998	7.1	61.1	2.8	57.1	1.6	62.0	4.6	77.4	2.7
$5,000 and over	416	4,464	7.8	64.4	2.5	63.2	1.2	65.7	4.2	64.4	2.8
			Percentage of disabling cases that were hospitalized								
Under $1,200	256	2,463	11.7	72.7	5.4	74.3	2.9	73.4	11.5	62.1	2.7
$1,200 but under $2,000	622	6,090	10.1	66.9	4.3	63.8	2.3	70.1	8.0	72.7	4.1
$2,000 but under $3,000	540	4,241	11.6	68.3	4.4	62.3	1.5	74.9	9.3	76.5	4.9
$3,000 but under $5,000	275	2,328	11.7	69.8	4.8	63.8	2.4	72.1	8.6	92.3	5.2
$5,000 and over	345	2,412	13.7	77.7	4.6	75.4	1.9	78.6	9.3	81.0	5.9
			Hospital days per hospital case								
Under $1,200	186	132	15.5	13.7	18.1	8.6	25.3	18.5	15.3	29.3	13.5
$1,200 but under $2,000	416	268	11.2	8.1	16.0	3.6	19.0	11.6	13.5	20.2	22.0
$2,000 but under $3,000	369	185	10.3	8.4	14.1	5.2	22.6	10.7	9.7	14.1	25.2
$3,000 but under $5,000	192	112	9.4	7.2	13.1	4.2	19.4	7.5	11.7	16.9	7.2
$5,000 and over	268	111	10.3	8.9	13.7	4.9	18.4	10.8	12.4	16.7	12.4
			Population								
Under $1,200	------	------	5,820			3,145		1,758		896	
$1,200 but under $2,000	------	------	13,419			6,989		4,792		1,596	
$2,000 but under $3,000	------	------	9,491			4,625		3,537		1,299	
$3,000 but under $5,000	------	------	4,911			2,132		1,893		855	
$5,000 and over	------	------	4,689			1,823		1,670		1,154	

[1] Exclusive of cases in mental and tuberculosis hospitals and in resident institutions for the care of other chronic diseases.
[2] All ages includes a few of unknown age.
[3] Rates per 1,000 are adjusted by the *indirect* method as described in note 3 of table 2.
Days per case and percentages of cases are not adjusted in any way.

hospitalized more frequently and get more days of hospital care than persons living in small towns and rural areas.

Looking at the same chart with special reference to income in cities of a given size, it can be seen that in cities over 100,000 and also in those of 5,000 to 100,000 population the highest hospital admission rates occurred in the highest and lowest income groups, with the three intervening income classes showing considerably lower rates. In small towns and rural areas, however, the low income group shows the lowest hospital rate with a regular increase as income increases. Presumably this difference is due to opportunities for free or nearly free

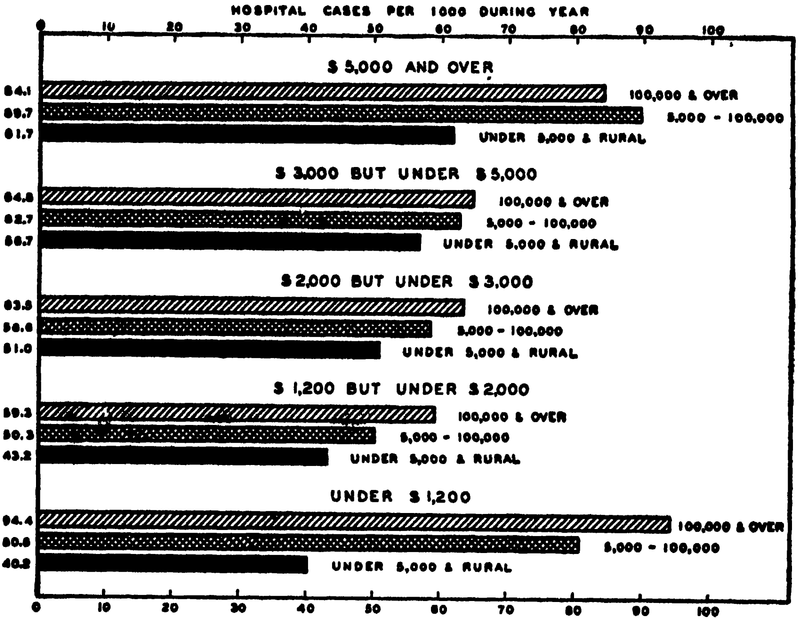

FIGURE 4.—Annual frequency of hospital admissions among persons of all ages in cities of different sizes for families of given annual income levels—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Age adjusted rates including all except cases in mental, tuberculosis, and other hospitals for the resident care of chronic diseases.)

hospital care among the city poor which did not exist in rural areas. Although the rates for high incomes in rural areas and for low incomes in large cities are based on small numbers, the general picture seems too consistent to be considered a chance phenomenon.

The high rates for the lowest and highest income groups in large and small cities is true also of hospital days per 1,000 population; in towns and rural areas the variation with income is less consistent. In general, the variations with size of city and income are less marked and less consistent for hospital days than for hospital admissions per 1,000 population (table 4).

Table 4.—*Hospitalization for all causes*[1] *among persons of all ages in families of different income levels in cities of different sizes—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

Annual family income	Total: Cities of 100,000 or over	Total: Cities 5,000–100,000	Total: Towns under 5,000 and rural	Surgical: Cities of 100,000 or over	Surgical: Cities 5,000–100,000	Surgical: Towns under 5,000 and rural	Nonsurgical: Cities of 100,000 or over	Nonsurgical: Cities 5,000–100,000	Nonsurgical: Towns under 5,000 and rural
	Hospital cases[1] per 1,000 population during year (age adjusted)[2]								
Under $1,200	94.4	80.8	40.2	51.2	39.7	23.0	43.2	41.1	17.2
$1,200 but under $2,000	59.3	50.3	43.2	34.5	30.6	25.0	24.8	19.7	18.2
$2,000 but under $3,000	63.5	58.6	51.0	42.6	33.5	34.4	20.9	25.1	16.6
$3,000 but under $5,000	64.8	62.7	56.7	39.9	39.3	34.5	24.9	23.4	22.2
$5,000 and over	84.1	89.7	61.7	59.0	62.1	41.2	25.1	27.6	20.5
	Annual hospital days per 1,000 population (age adjusted)[2]								
Under $1,200	1,808	1,129	695	1,081	467	396	727	662	299
$1,200 but under $2,000	777	550	530	409	238	243	368	312	287
$2,000 but under $3,000	801	580	509	450	297	324	351	283	185
$3,000 but under $5,000	664	545	590	289	291	348	375	254	242
$5,000 and over	954	880	499	584	522	277	370	358	222
	Percentage of all cases that were hospitalized								
Under $1,200	11.0	10.7	4.9	73.2	68.4	55.8	5.1	5.3	2.0
$1,200 but under $2,000	8.3	6.0	5.1	60.7	56.4	53.1	3.6	2.3	2.1
$2,000 but under $3,000	8.6	6.9	5.4	60.8	52.7	53.6	3.0	3.0	1.7
$3,000 but under $5,000	8.2	6.6	5.9	66.9	58.2	54.3	3.4	2.5	2.3
$5,000 and over	8.2	8.3	5.6	59.8	70.6	69.0	2.7	2.6	1.8
	Hospital days per hospital case								
Under $1,200	18.7	12.2	16.3	19.1	7.9	14.7	18.1	17.3	18.7
$1,200 but under $2,000	11.8	9.7	11.3	9.6	5.7	8.0	15.3	16.5	16.5
$2,000 but under $3,000	11.5	9.0	9.3	9.0	7.2	8.3	17.1	11.7	11.5
$3,000 but under $5,000	9.8	8.0	9.8	6.7	6.4	9.2	15.0	11.1	11.0
$5,000 and over	11.2	9.7	7.8	9.7	8.3	6.4	14.5	13.3	11.0
	Population			Number of surgical hospital cases			Number of nonsurgical hospital cases		
Under $1,200	772	1,236	3,812	41	54	91	30	45	57
$1,200 but under $2,000	4,675	2,873	5,871	170	93	153	113	54	96
$2,000 but under $3,000	4,166	2,490	2,835	183	88	98	83	60	42
$3,000 but under $5,000	2,334	1,314	1,263	95	53	44	58	28	26
$5,000 and over	2,389	1,805	495	140	108	20	59	43	9

[1] Exclusive of cases in mental and tuberculosis hospitals and in resident institutions for the care of other chronic diseases.

[2] Rates per 1,000 are adjusted by the *indirect* method as described in note 3 of table 2. Days per case and percentages of cases are not adjusted in any way.

In hospital days per admission a relatively long hospital duration of cases in the lowest income class is true in all three of the city-rural classifications. Hospital days per admission show no large variations among the income groups above $1,200 within a given size of city. However, the average stay for each income group tends to be longer in the large cities.

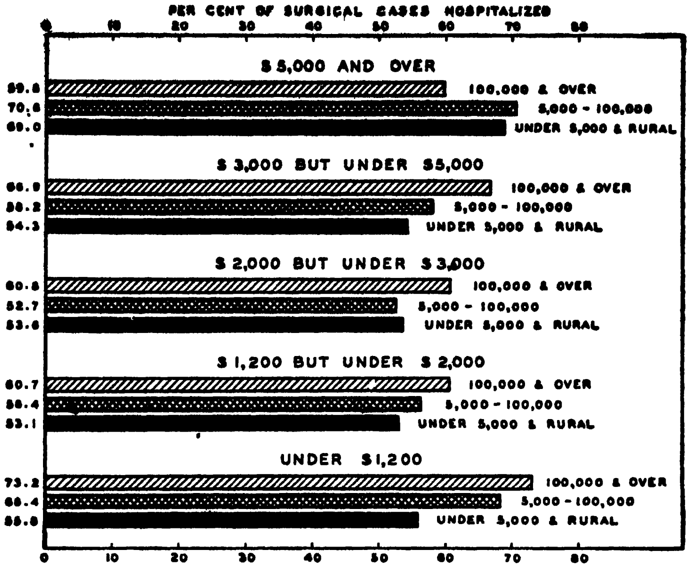

FIGURE 5.—Percent of all surgical cases that were hospitalized among persons of all ages in cities of different sizes among families of given annual income levels—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Includes all except cases in mental, tuberculosis, and other hospitals for the resident care of chronic diseases.)

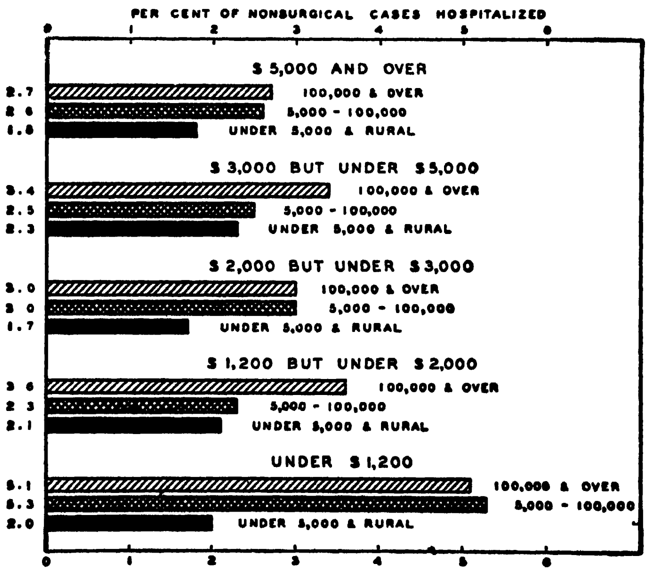

FIGURE 6.—Percent of all nonsurgical cases that were hospitalized among persons of all ages in cities of different sizes among families of given annual income levels—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Includes all except cases in mental, tuberculosis, and other hospitals for the resident care of chronic diseases.)

Figures 5 and 6 show the percentages of surgical and nonsurgical cases that were hospitalized among persons of given income levels living in towns and rural areas, small cities, and large cities. For both surgical and nonsurgical cases the percentage hospitalized in the several income groups is usually less in towns under 5,000 and rural areas than in larger communities. Although the percentages hospitalized are much less for nonsurgical cases, the *relative* differences between urban and rural districts are generally larger for nonsurgical than for surgical cases.

TABLE 5.—*Hospitalization for all causes* [1] *among persons of all ages in urban and rural parts of 4 geographic sections* [2]*—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

Size of city	Total				Surgical				Nonsurgical			
	North-east	North Central	South	West	North-east	North Central	South	West	North-east	North Central	South	West
	Hospital cases [1] per 1,000 population during year (age adjusted) [3]											
Cities of 5,000 or over	64.0	62.4	71.2	77.5	38.9	38.5	47 3	46.7	25.1	23.9	23 9	30 8
Under 5,000 and rural	44.7	44.1	31.0	64.0	29.0	25.0	22.9	34.8	15.7	19.1	8.1	29.2
	Annual hospital days [1] per 1,000 population (age adjusted) [3]											
Cities of 5,000 or over	879	721	763	940	438	371	446	496	441	350	317	444
Under 5,000 and rural	558	541	369	822	383	256	224	367	175	285	145	455
	Percentage of all cases that were hospitalized											
Cities of 5,000 or over	7 4	8 3	8 1	7.8	63.6	61.1	64.6	56.9	2.9	3.3	2.8	3.3
Under 5,000 and rural	4.5	5.2	4.4	6.8	59.4	50 5	59 8	53.2	1.6	2.1	1.1	3.1
	Percentage of disabling cases that were hospitalized											
Cities of 5,000 or over	11.2	14.0	12 4	13.9	76 2	73 3	73.5	70.3	4.5	5.8	4.4	6.2
Under 5,000 and rural	9.0	8.5	6.3	10.7	69.2	56.3	68.8	64.3	3.2	3.6	1.6	5 0
	Hospital days per hospital case											
Cities of 5,000 or over	12 7	10 5	9 7	11 8	9.7	8.0	7.9	10.1	18 0	14.9	13 8	14.5
Under 5,000 and rural	12.0	11.1	11 0	11.9	12.2	8 2	8.6	8.8	11.7	15 7	18 5	16.1
	Population				Number of surgical hospital cases				Number of nonsurgical hospital cases			
Cities of 5,000 or over	4,762	10,502	4,914	3,867	189	421	241	182	108	244	110	116
Under 5,000 and rural	4,281	3,911	2,827	3,480	126	103	64	126	62	64	20	92

[1] Exclusive of cases in mental and tuberculosis hospitals and in resident institutions for the care of other chronic diseases.
[2] States included in the survey were as follows: *Northeast.*—New York, Massachusetts, Connecticut. *North Central.*—Illinois, Ohio, Michigan; Indiana, Wisconsin, Minnesota, Kansas. *South.*—District of Columbia, Virginia, West Virginia, Tennessee, Georgia. *West.*—Washington, California, Colorado.
[3] Rates per 1,000 are adjusted by the *indirect* method as described in note 3 of table 2.
Days per case and percentages of cases are not adjusted in any way.

Size of city and geographic section.—Comparison of hospital care in different geographic regions does not mean much in the present study because the proportion of the surveyed population that is rural varies in the several sections and is not representative in this respect of the total population in the section.[9] However, it seems worth while to consider variation in hospitalization with size of city in given geographic regions. Table 5 shows hospital admission and day rates for towns under 5,000 and rural areas as compared with cities with 5,000 or more inhabitants, in each of four geographic sections. In both admissions and days of hospital care per 1,000 persons the urban adjusted rates for all ages are above the corresponding rural rates in all four sections for both surgical and nonsurgical cases, except for the nonsurgical day rate in the West. Table 5 also shows the percentage of *all* and of *disabling* cases that were hospitalized. Without exception these percentages are higher for urban than rural areas.

Although not shown here, rates and percentages of the several kinds in table 5 were computed for three broad age groups; these rates and percentages were almost all higher for cities than for towns and rural areas. Thus it appears that the various measures of hospitalization all indicate more hospital care in urban than rural parts of each of the four geographic sections.

Towns and rural areas with and without hospital facilities.—Families living in towns under 5,000 and rural unincorporated areas were classified as residing in communities with (a) available hospital facilities, and (b) no reasonably accessible facilities. Areas with available facilities included towns with a hospital other than for the care of mental diseases or tuberculosis either in the town or reasonably accessible [10] by car or other usual mode of travel; rural families were classified similarly according to the latter criterion.

Of the approximately 14,000 surveyed persons in towns and rural areas, 23 percent were classified as without reasonably accessible hospital facilities, the figure being 18 percent for small towns and 29 percent for rural areas.

A tabulation was made of the data from these town and rural schedules to show hospital rates and the percentage of cases hospitalized in communities with and without facilities. For persons of all ages, hospital admissions during the year amounted to 48 per 1,000 population for places with and 41 for those without facilities (table 6). The slightly higher admission rate for places with hospital facilities

[9] It is seen in table 5 that the rural South had low hospital admission rates for both surgical and nonsurgical cases, but the rates for the urban South were not low in this surveyed group. The West showed rather consistently high rates for both urban and rural areas.

[10] Roughly within 15 to 25 miles, depending upon the kind of roads.

is largely accounted for by the nonsurgical cases, less difference appearing for the surgical. In towns and rural areas with hospital facilities 9.1 percent of the disabling cases were hospitalized, as compared with 8.1 for communities without facilities. Of the disabling surgical cases, 65.7 percent were hospitalized for localities with and 57.1 for those without hospital facilities; the corresponding percentages for disabling nonsurgical cases were 3.7 for places with and 2.9 percent for those without hospital facilities.

TABLE 6.—*Hospitalization for all causes*[1] *among persons of all ages in communities with and without hospital facilities*[2]—*canvassed white families in towns under 5,000 and rural areas of 18 States*,[3] *1928–31*

Type of rate	Total		Surgical		Nonsurgical	
	Places with facilities	Places without facilities	Places with facilities	Places, without facilities	Places with facilities	Places without facilities
Hospital cases per 1,000 population during year (age adjusted)[4]	47.9	40.5	28.5	26.0	19.4	14.5
Annual hospital days per 1,000 population (age adjusted)[4]	603	483	328	262	275	221
Percent of all cases that were hospitalized	5.3	5.0	56.5	47.8	2.1	1.8
Percent of disabling cases that were hospitalized	9.1	8.1	65.7	57.1	3.7	2.9
Hospital days per hospital case	11.7	11.1	9.9	8.8	14.9	15.9
Number of hospital cases	525	132	330	89	195	43

[1] Exclusive of cases in mental and tuberculosis hospitals and in resident institutions for the care of other chronic diseases

[2] Communities with facilities include those with a hospital other than for tuberculosis and mental disease in the town or reasonably accessible to the family by automobile or other usual mode of travel

[3] Population observed Communities with facilities, 11,225 without facilities, 3,383

[4] Rates per 1,000 are adjusted by the *indirect* method as described in note 3 of table 2 Days per case and percentages of cases are not adjusted in any way

Distance to hospital and character of roads.—Of the 3,208 families living in towns under 5,000 and rural unincorporated areas, 3,146 reported the distance to the nearest hospital and the character of the roads. Of these surveyed families 32 percent lived within 5 miles of a hospital, 36 percent from 5 to 14 miles, 18 percent from 15 to 24 miles, and 14 percent over 25 miles from the nearest hospital. Of the total families, 94 percent reported good or fair roads to the nearest hospital and 6 percent reported poor roads during part or all of the year. Of the 2,954 families with good or fair roads, 29 percent were more than 15 miles from a hospital, but of the 192 families with poor roads, 78 percent were more than 15 miles from a hospital.

Considering only families that lived 5 or more miles from a hospital, the percentage of cases hospitalized was computed separately for households living on good or fair roads and for those on poor roads (table 7). Of the disabling surgical cases in families on good or fair roads, 64 percent were hospitalized as compared with 34 percent for those on poor roads. However, for disabling nonsurgical cases there were 3.4 percent hospitalized on the good or fair roads as compared with 4.5 on poor roads. Considering all cases, the families on good or

fair roads hospitalized 9.0 percent of the disabling cases as compared to 7.9 percent for those on poor roads. It must be remembered that all of these percentages are based on rather small numbers.

TABLE 7.—*Percentage of illnesses of all causes that were hospitalized among persons of all ages, classified according to the quality of the roads—canvassed white families 5 or more miles from a hospital in towns under 5,000 and rural areas of 18 States, 1928–31*

Severity of case	Total cases		Surgical cases		Nonsurgical cases	
	Good or fair roads	Poor[1] roads	Good or fair roads	Poor[1] roads	Good or fair roads	Poor[1] roads
	Percentage of cases of the given severity that were hospitalized					
All	5.2	4.3	55.6	25.0	1.9	2.3
Disabling	9.0	7.9	63.6	34.4	3.4	4.5
Bed	11.7	10.2	72.4	39.3	4.5	5.9
	Number of cases					
All	7,815	516	480	44	7,335	472
Disabling	4,541	277	420	32	4,121	245
Bed	3,510	216	369	28	3,141	188
Hospital	409	22	267	11	142	11

[1] Poor for part or all of the year.

TABLE 8.—*Percentage of illnesses of all causes that were hospitalized among families classified according to distance from a hospital—canvassed white families on good or fair roads in towns under 5,000 and rural areas of 18 States, 1928–31*

Severity of case	Total cases			Surgical cases			Nonsurgical cases		
	Miles to hospital								
	Under 5	5–14	15 and over	Under 5	5–14	15 and over	Under 5	5–14	15 and over
	Percentage of cases of the given severity that were hospitalized								
All	6.0	5.6	4.8	58.6	58.2	52.2	2.7	2.0	1.9
Disabling	9.4	9.9	8.0	70.0	65.7	60.7	4.3	3.7	3.2
Bed	11.2	12.6	10.6	78.2	74.0	70.1	5.2	4.8	4.2
	Number of cases								
All	3,873	4,322	3,493	227	273	207	3,646	4,049	3,286
Disabling	2,459	2,433	2,108	190	242	178	2,269	2,191	1,930
Bed	2,069	1,912	1,598	170	215	154	1,899	1,697	1,444
Hospital	231	240	169	133	159	108	98	81	61

In considering hospitalization in relation to the distance to the hospital, the data are limited to families living on good or fair roads.[11] Table 8 shows the percentage of cases hospitalized among such families

[11] The inclusion of families living on poor roads in the data on distance to the hospital would have the effect of increasing the excess in the percentage of cases hospitalized among those living near a hospital; this result comes from the fact that poor roads in this survey are more frequent for households living far from hospitals.

classified according to distance to the hospital. Of the disabling surgical cases among persons living within 5 miles of a hospital, 70 percent were hospitalized as compared with 66 for 5–14 miles and 61 percent for those living 15 or more miles from a hospital. Among disabling nonsurgical cases there is a similar decline in the proportion of cases hospitalized from 4.3 percent within 5 miles of a hospital to 3.7 for 5–14 miles and 3.2 among families living 15 or more miles from a hospital.

III. HOSPITALIZATION OF ILLNESS FROM IMPORTANT DIAGNOSES

Five more or less specific diagnoses account for about two-thirds of all hospital admissions and about half of the days of hospital care,

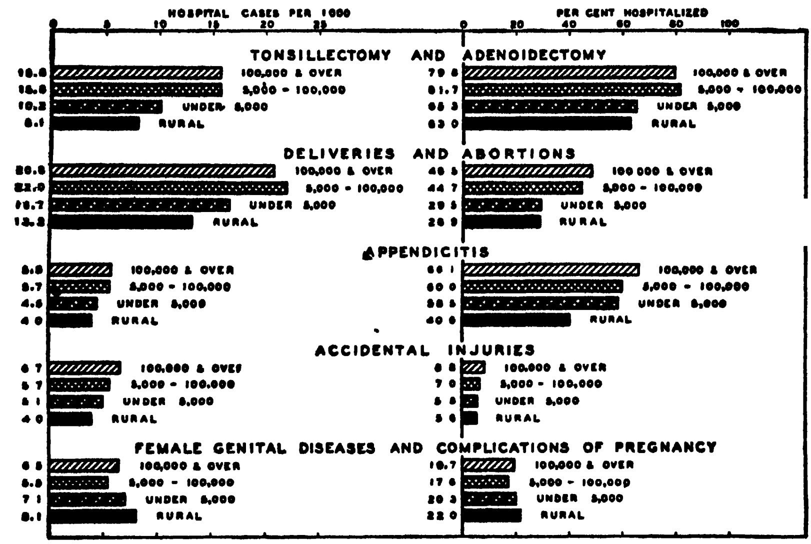

FIGURE 7.—Annual frequency of hospital admissions for certain diagnoses and the percentage of all cases that were hospitalized, by size of city—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31. (Age adjusted rates per 1,000 for sole or primary causes, rates for deliveries and female genital diseases are expressed as per 1,000 females.)

exclusive of hospitals for mental diseases, tuberculosis, and the resident care of other chronic diseases. These diagnoses are tonsillectomy and adenoidectomy, deliveries and abortions, appendicitis, accidental injuries, and female genital diseases and complications of pregnancy.

Size of city.—Figure 7 and table 9 show for these five diagnoses hospital admissions per 1,000 population and the percentage of all cases that were hospitalized in cities of different sizes and in rural areas. Considering admission rates, the first four diagnoses—tonsillectomy, deliveries, appendicitis, and accidents—all show higher admission rates in large cities than in rural areas, with the rates for

TABLE 9.—*Frequency of hospital cases of certain diagnoses in cities of different sizes and in rural areas—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

[Sole or primary diagnoses only]

Size of city	Number of hospital cases, all ages	Hospital cases per 1,000 population during year			Percentage of all cases of the given diagnosis that were hospitalized		
		All ages,[1] adjusted[2]	Age		All ages[1]	Age	
			Under 20	20–44		Under 20	20–44
	Tonsillectomy and adenoidectomy						
Cities of 100,000 or over	268	15.8	30.6	10.5	79.8	80.1	76.3
Cities 5,000–100,000	192	15.8	31.7	8.1	81.7	84.3	70.0
Towns under 5,000	96	10.2	18.4	7.7	65.3	61.4	74.1
Rural areas	68	8.1	15.8	4.7	63.0	62.2	62.5
	Appendicitis						
Cities of 100,000 or over	80	5.8	4.3	8.7	66.1	66.7	68.6
Cities 5,000–100,000	51	5.7	4.1	8.1	60.0	52.6	66.7
Towns under 5,000	31	4.5	3.7	6.2	58.5	51.9	64.0
Rural areas	26	4.0	4.5	4.3	40.6	43.2	34.6
	Accidental injuries						
Cities of 100,000 or over	91	6.7	4.4	7.0	8.8	5.6	10.7
Cities 5,000–100,000	52	5.7	6.5	4.6	7.0	7.4	6.9
Towns under 5,000	37	5.1	3.9	5.4	5.8	4.5	6.8
Rural areas	26	4.0	3.1	5.2	5.6	4.6	7.9
	Deliveries and abortions[4]						
Cities of 100,000 or over	163	20.8	(3)	51.3	48.5	(3)	48.0
Cities 5,000–100,000	105	22.0	(3)	54.7	44.7	(3)	44.5
Towns under 5,000	61	16.7	(3)	42.9	29.5	(3)	30.3
Rural areas	37	13.2	(3)	32.0	28.9	(3)	29.8
	Female genital diseases and complications of pregnancy[4]						
Cities of 100,000 or over	49	6.5	----------	14.7	19.7	----------	22.7
Cities 5,000–100,000	28	5.5	----------	12.9	17.6	----------	20.0
Towns under 5,000	26	7.1	----------	16.2	20.3	----------	24.2
Rural areas	24	8.1	----------	16.9	22.0	----------	26.0
		Population of both sexes			Female population		
Cities of 100,000 or over	----------	14,351	6,572	5,540	7,433	3,325	3,002
Cities 5,000–100,000	----------	9,694	4,916	3,449	4,911	2,447	1,866
Towns under 5,000	----------	7,585	3,812	2,589	3,900	1,904	1,421
Rural areas	----------	6,914	3,546	2,111	3,383	1,693	1,126

[1] All ages includes cases above 45 years and a few of unknown age. Rates for 45 years and over are omitted because of small numbers; of the 20 categories only 1 had more than 10 and only 6 had more than 4 hospital cases.

[2] Rates per 1,000 are adjusted by the *indirect* method as described in note 3 of table 2. Percentages of cases are not adjusted in any way.

[3] Rates and percentages omitted because of small numbers; 0 to 7 hospital cases and 5 to 11 total cases.

[4] Rates for deliveries and female genital diseases are computed as per 1,000 females. Throughout this paper benign tumors of the female genital organs and breast and other diseases of the female breast are included in the group of female genital diseases.

small cities and towns generally between the two extremes. The percentage of cases hospitalized shows approximately the same picture.

For the fifth important cause—female genital diseases and the complications of pregnancy—there are no very definite differences among the rates for communities of different sizes either in hospital admissions or the percentage of cases hospitalized. Since many of these conditions represent old results of childbirth, the tendency toward higher rates for rural areas may be associated with higher birth rates in those communities than in large cities.

Of the deliveries with live birth in this study for women residing in towns under 5,000 and rural areas, 28 percent occurred in hospitals, as compared with 48 percent for women living in cities over 5,000. In the United States in 1937, the first year for which data of this kind are available for residents of all urban and rural places, 25 percent of the live births to women residents of towns under 10,000 and rural areas occurred in hospitals, as compared with 71 percent to women residing in cities of 10,000 population or more (*25*, p. 14). Thus this study is in agreement with data for the entire country in indicating that in urban places a higher percentage of the births occur in hospitals. The percentage in hospitals is considerably larger for the urban United States than for urban canvassed families, but the survey figure represents approximately 1930 when fewer births occurred in hospitals.[12]

Family income.—Figure 8 and table 10 show in five income groups admission rates and the percentage of cases hospitalized for the same five important diagnoses. In general the variation with income is less definite than that with size of city; however, there is a tendency toward higher rates and percentages in the upper income levels for tonsillectomy and appendicitis. The one item that stands out with a large and consistent income difference is the percentage of deliveries that occur in hospitals. Among families with less than $1,200 annual income 26 percent of the deliveries took place in hospitals, as compared with 77 percent for families with incomes of $5,000 or more. The intervening income groups show a regular increase with economic status.

Size of city, income, and geographic section.—In table 11 the urban-rural comparison is made for persons of each of the five income levels, and in table 12 for persons in each of the four geographic sections. Tonsillectomy, which has the largest numbers, runs consistently higher in urban than rural areas in all income levels and in all geographic regions, both in hospital admission rates and in the percentage

[12] In the total United States the percentage of live births that occurred in hospitals increased from 37 in 1935 to 45 in 1937 and 51 percent in 1939 In Ontario, Canada, the proportion of live births that occurred in hospitals increased from 35 percent in 1930 to 47 in 1937 (*24*).

TABLE 10.—*Frequency of hospital cases of certain diagnoses among canvassed white families of different income levels in 18 States during 12 consecutive months, 1928–31*

[Sole or primary diagnoses only]

Annual family income	Number of hospital cases, all ages	Hospital cases per 1,000 population during year: All ages,[1] adjusted[2]	Hospital cases per 1,000 population during year: Age: Under 20	Hospital cases per 1,000 population during year: Age: 20–44	Percentage of all cases of the given diagnosis that were hospitalized: All ages	Percentage of all cases of the given diagnosis that were hospitalized: Age: Under 20	Percentage of all cases of the given diagnosis that were hospitalized: Age: 20–44
	Tonsillectomy and adenoidectomy						
Under $1,200	82	11.0	22.6	5.7	74.5	74.7	71.4
$1,200 but under $2,000	188	10.9	22.8	5.6	72.3	73.3	65.9
$2,000 but under $3,000	135	11.6	22.7	7.1	69.2	70.9	61.0
$3,000 but under $5,000	87	15.7	27.2	13.2	78.4	75.3	86.2
$5,000 and over	120	25.0	43.9	16.8	87.6	87.0	84.8
	Appendicitis						
Under $1,200	27	5.1	4.5	6.8	50.9	50.0	50.0
$1,200 but under $2,000	40	3.2	2.0	5.0	44.4	36.8	50.0
$2,000 but under $3,000	59	6.6	3.9	11.3	68.6	60.0	75.5
$3,000 but under $5,000	25	5.4	6.1	6.3	56.5	54.2	63.2
$5,000 and over	35	7.8	9.9	7.8	76.1	78.3	72.2
	Accidental injuries						
Under $1,200	32	5.8	4.5	6.3	8.5	7.3	9.9
$1,200 but under $2,000	70	5.6	3.9	6.9	7.7	5.7	10.0
$2,000 but under $3,000	40	4.5	3.5	3.7	5.7	4.0	5.9
$3,000 but under $5,000	28	5.9	4.7	5.8	6.6	4.7	7.3
$5,000 and over	30	6.6	9.3	5.4	6.9	7.5	7.3
	Deliveries and abortions[4]						
Under $1,200	48	19.5	(3)	49.1	26.4	(3)	27.8
$1,200 but under $2,000	121	18.1	(3)	44.7	33.9	(3)	33.0
$2,000 but under $3,000	99	20.2	(3)	51.2	45.0	(3)	45.0
$3,000 but under $5,000	49	18.3	(3)	44.7	59.8	(3)	59.5
$5,000 and over	43	18.5	(3)	44.9	76.8	(3)	76.4
	Female genital diseases and complications of pregnancy[4]						
Under $1,200	14	5.7	....	13.6	17.9	....	21.7
$1,200 but under $2,000	49	7.8	....	17.4	20.4	....	23.4
$2,000 but under $3,000	34	7.1	....	15.7	22.2	....	25.9
$3,000 but under $5,000	13	4.8	....	11.4	16.3	....	18.2
$5,000 and over	15	5.8	....	11.8	19.7	....	22.9
		Population of both sexes			Female population		
Under $1,200	....	5,820	3,145	1,758	2,942	1,529	957
$1,200 but under $2,000	....	13,419	6,989	4,792	6,784	3,495	2,528
$2,000 but under $3,000	....	9,491	4,625	3,537	4,837	2,307	1,913
$3,000 but under $5,000	....	4,911	2,132	1,893	2,553	1,075	1,051
$5,000 and over	....	4,689	1,823	1,670	2,398	899	935

[1] All ages includes cases above 45 years and a few of unknown age. Rates for 45 years and over are omitted because of small numbers; of the 25 categories only 1 had more than 10 and only 6 had more than 4 hospital cases.

[2] Rates per 1,000 are adjusted by the *indirect* method as described in note 3 of table 2. Percentages of cases are not adjusted in any way.

[3] Rates and percentages omitted because of small numbers; 0 to 7 hospital cases and 0 to 13 total cases.

[4] Rates for deliveries and female genital diseases are computed as per 1,000 females. See also note 4, table 9.

of cases that were hospitalized. Deliveries, appendicitis, and accidental injuries are less consistent but they all tend definitely toward higher admission rates and percentages hospitalized in urban than rural areas in the various categories. However, hospital cases of female genital diseases tend to run lower in urban than rural areas.

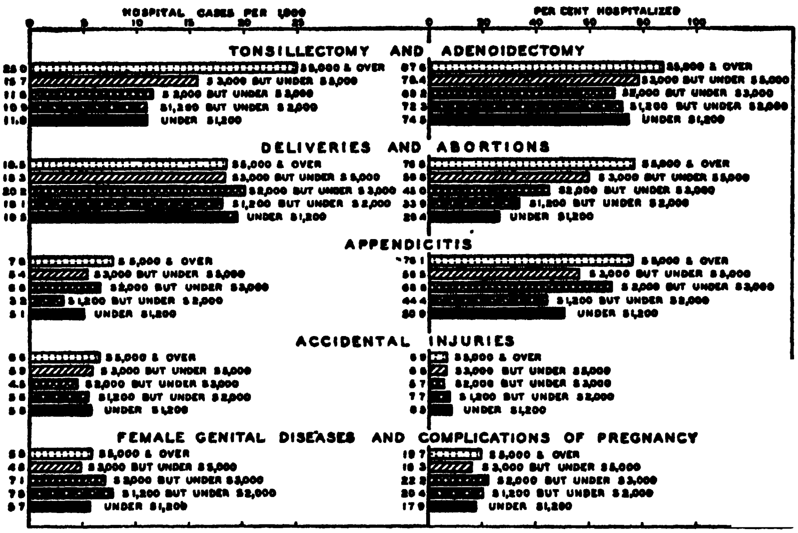

FIGURE 8.—Annual frequency of hospital admissions for certain diagnoses and the percentage of all cases that were hospitalized, by annual family income—8,758 canvassed white families in 18 States during 12 consecutive months, 1928-31 (Age adjusted rates per 1,000 for sole or primary causes; rates for deliveries and female genital diseases are expressed as per 1,000 females).

IV. SUMMARY

Data on the frequency of illness and hospital care were recorded for a 12-month period between 1928 and 1931 by periodic canvasses of 8,758 white families in 130 localities in 18 States. The surveyed families include representation from nearly all geographic sections, from rural, urban, and metropolitan areas, from all income classes and of both native and foreign-born persons. Visits were made at intervals of 2 to 4 months. Illnesses causing symptoms for 1 day or longer were recorded, together with the number of cases that were hospitalized and the days of hospital service within the study year. Hospital care in this report excludes that in institutions for mental diseases, tuberculosis, and the resident care of other chronic diseases.

Hospital rates were lower for rural than for urban areas and were lower for small towns than for large cities. Hospital admissions per 1,000 population, hospital days per 1,000, and the percentage of illnesses that were hospitalized all showed this increase with size of city.

Persons who were living in rural areas received less hospital care than those of the same income level who were living in large cities.

TABLE 11.—*Frequency of hospital cases of certain diagnoses among persons of all ages in families of different income levels in urban and rural areas—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

[Sole or primary diagnoses only]

Diagnosis and size of city	Hospital cases per 1,000 population [1] during year (age adjusted) [2]					Percentage of all cases of the given diagnosis that were hospitalized					Number of hospital cases, all incomes
	Under $1,200	$1,200 but under $2,000	$2,000 but under $3,000	$3,000 but under $5,000	$5,000 and over	Under $1,200	$1,200 but under $2,000	$2,000 but under $3,000	$3,000 but under $5,000	$5,000 and over	
Tonsillectomy and adenoidectomy:											
Cities of 5,000 or over	16.2	12.7	12.9	16.6	26.5	91.5	77.5	71.6	81.0	89.7	460
Under 5,000 and rural	8.1	8.6	8.6	13.2	13.0	61.9	64.0	61.7	70.4	63.6	164
Appendicitis:											
Cities of 5,000 or over	5.0	3.6	7.1	4.8	8.5	42.9	50.0	76.3	54.8	79.1	131
Under 5,000 and rural	5.2	2.5	5.3	7.2	2.1	56.3	36.8	51.9	60.0	33.3	57
Accidental injuries:											
Cities of 5,000 or over	9.5	6.4	5.0	6.3	6.6	13.1	9.3	6.4	7.5	7.1	143
Under 5,000 and rural	3.8	4.5	3.4	5.0	6.3	5.8	5.8	4.1	4.7	5.4	63
Deliveries and abortions: [1]											
Cities of 5,000 or over	33.1	21.2	20.1	20.7	17.9	38.5	38.1	47.4	65.6	75.5	268
Under 5,000 and rural	11.6	13.5	20.5	10.7	24.6	17.6	26.9	39.7	38.9	71.4	98
Female genital diseases and complications of pregnancy: [1]											
Cities of 5,000 or over	10.5	6.4	6.1	4.9	5.2	34.6	17.6	19.1	17.2	17.4	75
Under 5,000 and rural	3.2	9.9	9.3	4.6	12.1	9.6	23.9	30.2	13.6	42.9	50
	Population of both sexes					Female population					
Cities of 5,000 or over	2,008	7,548	6,656	3,648	4,194	1,031	3,858	3,389	1,895	2,169	------
Under 5,000 and rural	3,812	5,871	2,835	1,263	495	1,911	2,926	1,448	658	229	------

[1] Rates for deliveries and female genital diseases are computed as per 1,000 females. See also note 4, table 9

[2] Rates per 1,000 are adjusted by the *indirect* method as described in note 3 of table 2. Days per case and percentages of cases are not adjusted in any way.

In cities the highest rates for admissions and days of hospital care occurred in the highest and lowest income groups; in rural areas the lowest income group had the lowest hospital rates. The lowest income group in both urban and rural areas had the longest average days per hospital case.

Small towns and rural areas without reasonably accessible hospital facilities had somewhat less hospital care than those with facilities. Families on poor roads had a smaller percentage of cases hospitalized than those on good roads, and families far from a hospital even on good or fair roads had a smaller percentage of cases hospitalized than those living nearer a hospital.

Four important diagnoses which are responsible for about half of all hospital service (tonsillectomy, deliveries, appendicitis, and accidental injuries) all showed higher hospital admission rates and percentages of cases hospitalized for urban than for rural families. The first three of these diagnoses tend toward higher percentages of cases hospitalized in the higher income levels. In the percentage of

cases hospitalized, deliveries showed the largest and most regular increases with income.

TABLE 12.—*Frequency of hospital cases of certain diagnoses among persons of all ages in urban and rural parts of four geographic sections*[1]*—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

[Sole or primary diagnoses only]

Diagnosis and size of city	Hospital cases per 1,000 population[2] during year (age adjusted)[3]				Percentage of all cases of the given diagnosis that were hospitalized				Number of hospital cases all geographic sections
	Northeast	North Central	South	West	Northeast	North Central	South	West	
Tonsillectomy and adenoidectomy:									
Cities of 5,000 or over	13.3	16 1	17 1	16.3	90.5	80 1	82 4	70.5	460
Under 5,000 and rural	9.2	8.6	7.7	11.0	80.7	51 8	79.4	59.5	164
Appendicitis.									
Cities of 5,000 or over	7.3	4.9	5 6	6.2	84 6	57.6	57 8	62 2	131
Under 5,000 and rural	3 7	3 6	5.8	4.3	46.7	41 9	61 5	46.7	57
Accidental injuries									
Cities of 5,000 or over	6 9	5.6	8.2	5 0	9 3	7 8	9.8	5 3	143
Under 5,000 and rural	5 5	3.3	1.9	7.0	8 0	3.6	3.1	7.2	63
Deliveries and abortions[2]									
Cities of 5,000 or over	14.5	23 7	19.7	23.8	35 4	47.7	41 0	69 4	268
Under 5,000 and rural	16.0	14.8	3.3	23 5	29 0	36 2	6 6	38 8	98
Female genital diseases[2] and complications of pregnancy									
Cities of 5,000 or over	5 0	4.5	10.5	6.5	21.4	15 5	21.9	19 4	75
Under 5,000 and rural	7 0	9 6	5.0	7.9	20.3	27 9	14 3	20 0	50
	Population of both sexes				Female population				
Cities of 5,000 or over	4,762	10,502	4,914	3,867	2,475	5,340	2,507	2,022	-------
Under 5,000 and rural	4,281	3,911	2,827	3,480	2,126	1,970	1,422	1,765	-------

[1] See note 2 to table 5 for States included in each section.
[2] Rates for deliveries and female genital diseases are computed as per 1,000 females See also note 4, table 9
[3] Rates per 1,000 are adjusted by the *indirect* method as described in note 3 of table 2. Days per case and percentages of cases are not adjusted in any way.

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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

September 13–October 10, 1942

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended October 10, 1942, the number reported for the

corresponding period in 1941, and the median number for the years 1937–41.

DISEASES ABOVE MEDIAN PREVALENCE

Influenza.—For the 4 weeks ended October 10 there were 3,503 cases of influenza reported, as compared with 3,358, 2,165, and 1,835 during the corresponding period in 1941, 1940, and 1939, respectively. While the current incidence was only slightly above that recorded in 1941, it was more than 60 percent above the 1937–41 average incidence. The increase appears to be largely due to an excess of cases in the South Atlantic, West South Central, and Mountain regions. However, a rise in the mortality from all causes for the weeks ended October 3 and 10 indicate that the influenza situation should be watched. (See discussion below under Mortality.)

Meningococcus meningitis.—For the country as a whole, meningococcus meningitis continued at a relatively high level. The total number of cases reported during the current period was 192, representing an increase of approximately 80 percent over the normal seasonal level. All regions except the East and West South Central contributed to the increase.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The number of cases (1,732) of diphtheria reported for the 4 weeks ended October 10 was only slightly below the number reported for the corresponding period in 1941, but it was only about 75 percent of the 1937–41 average incidence. The Middle Atlantic, South Atlantic, East North Central, and East South Central regions reported very definite declines from the expected seasonal incidence, while in other regions the numbers of cases were about normal.

Measles.—The incidence of measles was also relatively low, 2,484 cases being reported for the current period, as compared with 3,200 cases in 1941 and an average of approximately 3,000 cases during the corresponding period in the 5 preceding years. The incidence was comparatively low in all regions except the New England, West North Central, Mountain, and Pacific; the two latter regions reported the largest excesses over the seasonal expectancy, the New England a minor excess and in the West North Central region the incidence was about normal.

Poliomyelitis.—For the current period there were 855 cases of poliomyelitis reported, as compared with 2,239 cases in 1941, which figure also represents the 1937–41 median incidence for this period. With the exception of the year 1938, when only 244 cases were reported for this period, the current incidence is the lowest recorded for the same weeks since 1929. Each section of the country shared in the favorable situation of this disease that now exists.

Poliomyelitis is normally more prevalent during the summer and early fall months and in preceding years the highest incidence has been recorded during the latter part of September or the first part of October. With the exception of a slight rise in cases in the South Central regions in the summer, the disease has been relatively low in all sections of the country and it is probable that the current incidence will represent the peak of this disease for 1942.

Scarlet fever.—The reported cases of scarlet fever totaled 5,165, an increase of approximately 3,000 over the preceding 4-week period. All regions contributed to the increase. Compared with recent years, the incidence was about 20 percent in excess of the incidence in 1941, but it was only about 95 percent of the normal seasonal expectancy (approximately 5,400 cases). The incidence was relatively high in the New England, Middle Atlantic, South Atlantic, and East South Central regions, but in other regions the number of cases was less than the average number for recent years.

Smallpox.—The cases (19) of smallpox dropped below even the previous year, when 21 cases were reported, and the number is the lowest on record for this period. The low incidence of this disease seems to be largely due to the decline in the number of cases in the North Central, Mountain, and Pacific regions, where the normal prevalence of the disease is higher than in other regions.

Typhoid fever.—The typhoid fever situation was also quite favorable. The number of cases (813) reported for the current 4-week period was less than 70 percent of the preceding 5-year median incidence. In only one region, the New England, was the disease more prevalent than the 5-year expectancy. Other regions reported decreases from the 1937–41 median ranging from more than 20 percent in the Mountain region to more than 60 percent in the West North Central and Pacific regions.

Whooping cough.—The whooping cough incidence was also below normal, the 10,245 cases representing a decline from the incidence in 1941 of approximately 20 percent, and the figure was about 10 percent below the average incidence for the corresponding period in the years 1938–41. The New England region reported an increase of about 60 percent over the normal seasonal incidence and a very slight increase occurred in the Mountain region, but in all other regions the incidence was below the average of recent years.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ended October 10, based on data received from the Bureau of the Census, was 11.2 per 1,000 inhabitants (annual basis). The current rate was about 6 percent above the average rate of 10.6 for

the corresponding period in the 3 preceding years. There was a rise in the last 2 weeks of the period to 11.5 for the week ended October 3 and 12.2 for October 10, as compared with a 3-year average of 10.6 and 10.8 for the 2 weeks, respectively. However, the rate for October 17 was down to the approximate level of October 3. A tabulation of influenza and pneumonia deaths for the week ended October 3 (latest available date) for a smaller group of cities indicated some increase, but there was no excess in reported cases of influenza.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period September 13–October 10, 1942, the number for the corresponding period in 1941, and the median number of cases reported for the corresponding period, 1937–41

Division	Current period	1941	5-year median	Current period	1941	5-year median	Current period	1941	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	1,732	1,759	2,296	3,503	3,358	2,165	2,484	3,200	3,033
New England	36	25	30	9	3	9	286	304	261
Middle Atlantic	57	69	113	54	18	34	460	622	622
East North Central	120	161	224	222	225	222	391	519	519
West North Central	115	110	113	56	29	53	183	164	177
South Atlantic	607	707	971	1,225	936	790	124	572	249
East South Central	255	273	431	119	55	163	54	187	187
West South Central	298	294	294	1,369	1,642	591	67	260	117
Mountain	69	67	67	334	300	187	361	213	213
Pacific	85	53	93	115	150	101	558	359	359
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	192	103	107	855	2,239	2,239	5,165	4,281	5,357
New England	20	14	7	40	151	47	494	355	286
Middle Atlantic	52	29	28	186	793	458	859	625	816
East North Central	19	5	17	270	378	378	1,208	1,113	1,576
West North Central	10	5	9	127	116	270	534	482	680
South Atlantic	41	25	25	69	314	83	961	650	790
East South Central	11	7	11	41	324	57	494	426	456
West South Central	5	9	9	42	45	65	181	154	186
Mountain	5	4	4	34	30	71	149	156	202
Pacific	29	5	5	46	88	125	285	320	441
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	19	21	125	813	1,216	1,692	10,745	13,015	[3] 12,265
New England	0	0	0	49	29	31	1,285	978	819
Middle Atlantic	0	0	0	108	190	190	2,806	2,835	2,845
East North Central	6	7	16	109	142	238	3,328	4,197	3,567
West North Central	0	5	29	45	83	115	451	823	581
South Atlantic	3	1	1	150	273	297	835	1,288	1,224
East South Central	4	6	6	107	167	217	294	509	466
West South Central	4	1	9	152	234	341	434	509	465
Mountain	2	1	27	60	46	79	478	701	450
Pacific	0	0	10	33	52	90	834	1,175	954

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.
[2] Mississippi excluded.
[3] 4 years (1938–41) only.

INCIDENCE OF HOSPITALIZATION, SEPTEMBER 1942

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 8,000,000 members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service. The data cover about 60 hospital service plans scattered throughout the country, mostly in large cities.

Item	September 1942	September 1941
1. Number of plans supplying data	60	56
2. Number of persons eligible for hospital care	8,563,567	6,029,508
3. Number of persons admitted for hospital care	78,140	54,398
4. Incidence per 1,000 persons, annual rate, during current month (daily rate ×365)	110.9	109.7
5. Simple average of annual rates for the 12 months ended Sept. 30	107.5	

DEATHS DURING WEEK ENDED OCTOBER 17, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 17, 1942	Corresponding week 1941
Data from 88 large cities of the United States:		
Total deaths	8,343	7,597
Average for 3 prior years	7,691	
Total deaths, first 41 weeks of year	341,753	342,498
Deaths per 1,000 population, first 41 weeks of year, annual rate	11.6	11.7
Deaths under 1 year of age	628	540
Average for 3 prior years	497	
Deaths under 1 year of age, first 41 weeks of year	23,461	21,503
Data from industrial insurance companies:		
Policies in force	65,156,032	64,546,105
Number of death claims	8,861	9,186
Death claims per 1,000 policies in force, annual rate	7.1	7.4
Death claims per 1,000 policies, first 41 weeks of year, annual rate	9.1	9.5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED OCTOBER 24, 1942

Summary

The current incidence of meningococcus meningitis and endemic typhus fever is considerably above the median expectancy based on reports for the past 5 years. Of 61 cases of meningococcus meningitis reported during the current week (5-year median for the week, 37), more than half occurred in the Middle and South Atlantic States, where the largest numbers of cases have been reported during the current year. No cases were reported during the current week in either the West North Central or Mountain States. Of 123 cases of endemic typhus fever, 47 cases occurred in Georgia and 40 cases in Texas. A total of 2,902 cases has been reported to date this year, as compared with a total of 2,784 for the entire year 1941 and 1,882 in 1940.

The incidence of influenza is above the 5-year median. Of the total of 1,143 cases reported during the current week (5-year median, 856), 71 percent occurred in three southern States—Texas 414, South Carolina 272, and Virginia 138.

Of 281 cases of bacillary dysentery, 173 occurred in Texas. A total of 10,629 cases has been reported to date this year, the largest number occurring in Texas. Outbreaks were reported in Newton, Kansas (2,535 cases from September 2 to 14) and in Wrentham (State School), Massachusetts (310 cases reported during week ended October 17).

The crude death rate for 88 large cities in the United States for the current week is 11.7 per 1,000 population, as compared with 11.6 for the preceding week and a 3-year (1938–41) average of 11.1. The accumulative rate to date is 11.6, which is the same as that for the corresponding period in 1941. This is the first time since January that the accumulative rate this year has been as high as that for last year. Since August, however, these rates have been drawing together, due to the much higher rate in recent weeks than for the corresponding weeks last year.

Telegraphic morbidity reports from State health officers for the week ended October 24, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Oct. 24, 1942	Oct. 25, 1941		Oct. 24, 1942	Oct. 25, 1941		Oct. 24, 1942	Oct. 25, 1941		Oct. 24, 1942	Oct. 25, 1941	
NEW ENG.												
Maine	1	0	1	------	------	1	7	62	31	2	2	1
New Hampshire	0	0	0	------	------	------	1	1	1	0	0	0
Vermont	0	4	0	------	------	------	66	1	3	0	0	0
Massachusetts	4	2	3	------	------	------	199	101	71	2	2	1
Rhode Island	2	0	0	------	------	------	0	9	0	1	0	0
Connecticut	2	0	1	3	------	------	10	21	6	2	0	0
MID. ATL.												
New York	17	16	17	[1] 12	[1] 4	[1] 6	93	71	91	16	0	1
New Jersey	8	9	8	8	3	4	24	40	40	2	0	0
Pennsylvania	11	8	15	1	1	------	105	123	135	5	5	2
E. NO. CEN.												
Ohio	21	20	33	6	6	4	22	63	11	2	0	1
Indiana	14	17	23	2	29	14	8	1	5	0	0	1
Illinois	18	12	27	6	8	8	11	32	32	3	2	3
Michigan [2]	10	9	9	1	------	------	35	38	39	0	2	1
Wisconsin	1	2	2	19	18	25	34	53	53	2	1	0
W. NO. CEN.												
Minnesota	3	2	4	------	1	1	14	4	6	0	0	0
Iowa	2	2	2	2	------	------	18	28	13	0	1	0
Missouri	7	10	13	------	10	10	3	7	7	0	0	0
North Dakota	1	0	1	7	1	1	1	86	1	0	0	0
South Dakota	7	3	1	------	------	------	4	2	2	0	0	0
Nebraska	0	8	5	3	------	------	36	4	2	0	0	0
Kansas	2	3	6	2	1	4	4	15	6	0	1	0
SO. ATL.												
Delaware	2	2	1	------	------	------	0	0	0	0	0	0
Maryland [2]	5	7	7	3	4	6	4	11	3	7	3	1
Dist. of Col.	3	1	1	------	1	------	0	1	1	3	0	0
Virginia	53	49	77	138	177	56	4	17	29	1	1	0
West Virginia	7	15	18	10	14	14	2	61	3	1	0	2
North Carolina	83	125	125	2	------	3	3	115	86	0	3	2
South Carolina	85	41	32	272	162	198	3	6	6	0	0	1
Georgia	51	53	53	22	30	30	1	11	3	1	0	0
Florida	13	5	5	3	34	2	2	1	2	0	1	1
E. SO. CEN.												
Kentucky	24	11	20	3	------	3	12	11	11	0	2	2
Tennessee	14	24	40	9	8	22	7	13	12	0	3	2
Alabama	29	44	41	39	21	24	3	27	4	1	1	1
Mississippi [2]	18	14	17	------	------	------	------	0	------	2	0	1
W. SO. CEN.												
Arkansas	15	14	26	19	27	27	2	13	2	1	0	0
Louisiana	19	5	20	4	6	4	3	0	1	0	0	0
Oklahoma	9	11	14	15	51	26	2	35	2	0	0	0
Texas	56	82	47	414	543	140	3	17	17	0	0	1
MOUNTAIN												
Montana	0	2	2	------	------	15	3	5	7	0	0	0
Idaho	0	0	0	10	------	1	28	9	9	0		0
Wyoming	0	0	1	5	9	------	4	1	1	0	0	0
Colorado	17	9	9	24	28	9	8	61	19	0	0	0
New Mexico	0	0	3	1	------	1	7	6	9	0	0	0
Arizona	0	3	5	36	65	54	7	74	3	0	0	0
Utah [2]	0	0	0	3	1	1	101	6	6	0	0	0
Nevada	0	0	------	------	------	------	1	0	------	0	0	------
PACIFIC												
Washington	6	1	2	1	3	------	176	3	6	1	1	1
Oregon	4	12	1	9	18	7	80	18	9	1	0	0
California	17	16	23	29	46	22	40	128	105	5	1	2
Total	656	668	769	1,143	1,330	856	1,201	1,435	1,435	61	32	37
42 weeks	11,193	11,726	16,960	88,357	497,956	174,921	473,050	831,943	353,771	2,843	1,674	1,674

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 24, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Oct. 24, 1942	Oct. 25, 1941		Oct. 24, 1942	Oct. 25, 1941		Oct. 24, 1942	Oct. 25, 1941		Oct. 24, 1942	Oct. 25, 1941	
NEW ENG.												
Maine	1	0	0	16	6	12	0	0	0	0	0	2
New Hampshire	3	0	0	7	2	2	0	0	0	0	1	1
Vermont	2	1	0	4	5	5	0	0	0	0	0	0
Massachusetts	3	11	4	169	108	72	0	0	0	2	6	3
Rhode Island	0	0	0	4	4	4	0	0	0	0	0	1
Connecticut	0	6	2	26	21	21	0	0	0	0	1	2
MID. ATL.												
New York	9	57	29	131	107	163	0	0	0	15	14	14
New Jersey	9	15	5	46	51	51	0	0	0	2	7	3
Pennsylvania	5	16	6	114	102	179	0	0	0	10	10	10
E. NO. CEN.												
Ohio	10	17	6	156	171	174	0	0	0	28	4	12
Indiana	4	5	4	29	51	103	0	0	2	6	0	3
Illinois	20	12	10	148	135	178	0	1	1	11	7	11
Michigan [2]	5	8	12	63	122	165	0	6	1	2	4	3
Wisconsin	0	4	7	162	96	96	0	0	0	0	2	1
W. NO. CEN.												
Minnesota	4	15	15	57	31	57	0	0	1	0	1	1
Iowa	0	2	11	29	35	58	3	1	1	1	0	2
Missouri	5	2	2	85	34	56	3	0	1	0	2	5
North Dakota	1	1	1	6	6	14	0	0	0	0	0	1
South Dakota	0	1	1	12	20	23	0	0	0	0	2	1
Nebraska	8	0	2	13	6	13	1	0	0	0	0	0
Kansas	8	1	2	29	44	75	0	0	0	3	1	1
SO. ATL.												
Delaware	2	3	0	5	8	6	0	0	0	1	2	2
Maryland [3]	1	4	2	37	21	28	0	0	0	5	6	6
District of Columbia	0	5	1	14	13	12	0	0	0	0	0	0
Virginia	0	6	5	63	52	44	0	0	0	5	11	10
West Virginia	0	3	3	56	51	72	2	0	0	7	4	7
North Carolina	3	5	3	116	85	85	0	0	0	12	2	5
South Carolina	8	5	0	32	12	14	0	0	0	3	8	8
Georgia	1	6	1	44	35	35	0	0	0	8	8	8
Florida	1	1	1	8	8	8	0	0	0	1	0	2
E. SO. CEN.												
Kentucky	0	5	5	48	78	78	1	0	0	4	12	12
Tennessee	3	22	3	46	80	62	0	0	0	11	6	14
Alabama	2	12	2	47	36	36	0	1	0	2	7	5
Mississippi [3]	3	7	3	21	13	13	0	1	0	2	4	4
W. SO. CEN.												
Arkansas	1	3	3	12	5	17	0	0	0	2	5	7
Louisiana	0	1	1	4	4	8	0	0	0	2	6	12
Oklahoma	2	5	2	26	18	23	0	1	1	5	4	12
Texas	13	7	7	42	30	38	3	0	1	10	14	21
MOUNTAIN												
Montana	0	2	0	8	18	16	0	0	0	0	0	1
Idaho	0	0	1	6	14	14	0	0	0	0	2	2
Wyoming	4	0	0	2	3	7	0	0	0	2	0	1
Colorado	2	2	2	22	18	26	0	0	1	3	1	3
New Mexico	0	0	1	2	6	8	0	1	0	6	1	6
Arizona	0	0	0	1	1	5	0	0	0	1	0	3
Utah [2]	1	0	2	3	8	8	0	0	0	1	1	1
Nevada	1	0	------	7	0	------	0	0	------	0	5	------
PACIFIC												
Washington	0	6	3	18	28	27	0	0	0	1	1	3
Oregon	1	5	2	8	3	13	3	2	2	0	1	3
California	19	5	7	85	97	121	0	0	3	3	5	7
Total	165	294	294	2,089	1,902	2,277	16	14	28	177	178	278
42 weeks	3,379	7,880	7,880	100,567	100,546	131,380	674	1,207	8,546	5,866	7,346	11,003

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 24, 1942—Continued

Division and State	Whooping cough, Week ended Oct. 24, 1942	Whooping cough, Week ended Oct. 25, 1941	Anthrax	Dysentery, Amebic	Dysentery, Bacillary	Dysentery, Unspecified	Encephalitis	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
			Week ended October 24, 1942								
NEW ENG.											
Maine	57	29	0	0	0	0	0	0	0	0	0
New Hampshire	0	16	0	0	0	0	0	0	0	0	0
Vermont	34	17	0	0	0	0	0	0	0	0	0
Massachusetts	169	134	0	0	1	0	0	0	0	0	0
Rhode Island	21	31	0	0	0	0	0	0	0	0	0
Connecticut	81	49	0	0	3	0	0	0	0	0	0
MID. ATL.											
New York	330	387	0	4	52	0	3	0	0	0	0
New Jersey	134	173	0	2	0	0	0	0	0	0	0
Pennsylvania	331	219	0	1	0	0	0	0	0	0	0
E. NO. CEN.											
Ohio	165	152	0	0	0	0	1	0	0	0	0
Indiana	17	14	0	0	0	0	0	0	0	0	0
Illinois	161	266	0	1	11	0	1	0	1	1	0
Michigan [1]	231	343	0	5	7	0	0	0	0	0	0
Wisconsin	161	260	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	41	70	0	0	1	0	0	0	0	0	0
Iowa	24	20	0	0	0	0	0	0	0	0	0
Missouri	13	22	0	0	0	2	0	0	0	0	0
North Dakota	3	24	0	0	0	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0	0	0	0	0	0
Nebraska	9	5	0	0	0	0	0	0	0	0	0
Kansas	24	35	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	11	2	0	0	0	0	0	0	0	0	0
Maryland [2]	62	41	0	0	0	12	0	0	0	0	0
Dist. of Col.	4	14	0	0	0	0	0	0	0	0	0
Virginia	24	43	0	0	0	67	0	0	0	1	0
West Virginia	12	36	0	0	0	0	0	0	0	0	0
North Carolina	57	91	0	0	0	0	0	0	0	0	0
South Carolina	25	38	0	0	12	0	0	0	0	0	7
Georgia	23	3	0	2	2	0	0	0	0	1	47
Florida	6	9	0	0	0	0	0	0	0	0	9
E. SO. CEN.											
Kentucky	24	81	0	0	1	0	0	0	0	0	0
Tennessee	24	36	0	0	0	1	0	0	0	0	4
Alabama	29	26	0	0	0	0	0	0	0	0	11
Mississippi [2]	------	0	0	0	0	0	0	0	0	0	2
W. SO. CEN.											
Arkansas	29	10	0	1	4	0	0	0	0	1	0
Louisiana	2	5	0	1	2	0	0	1	0	0	3
Oklahoma	7	5	0	0	0	0	0	0	0	0	0
Texas	115	72	0	11	173	0	0	0	0	0	40
MOUNTAIN											
Montana	27	31	0	0	0	0	0	0	0	0	0
Idaho	1	2	0	0	0	0	0	0	0	0	0
Wyoming	5	9	0	0	0	0	0	0	0	0	0
Colorado	19	44	0	0	0	0	2	0	0	0	0
New Mexico	12	13	0	0	1	0	0	0	0	0	0
Arizona	2	3	0	0	0	13	0	0	0	0	0
Utah [2]	27	10	0	0	0	0	0	0	0	0	0
Nevada	0	1	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	14	63	0	0	0	0	1	0	0	0	0
Oregon	5	14	0	0	0	0	0	0	0	0	0
California	208	155	0	1	11	0	1	0	0	0	0
Total	2,780	3,123	0	29	281	95	9	1	1	4	123
42 weeks	147,130	174,194									

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended October 10, 1942

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga.	1	0	5	0	0	2	3	1	6	0	1	1
Baltimore, Md.	0	0	2	1	2	2	17	0	18	0	1	61
Billings, Mont.	0	0	------	0	0	0	0	0	0	0	0	0
Birmingham, Ala.	0	0	2	0	0	0	2	0	2	0	0	0
Boise, Idaho	0	0	------	0	0	0	0	0	0	0	0	0
Boston, Mass.	1	1	------	0	8	0	11	0	42	0	0	51
Bridgeport, Conn.	0	0	------	0	1	0	0	1	4	0	0	1
Brunswick, Ga.	0	0	------	0	0	0	0	0	0	0	0	0
Buffalo, N. Y.	0	0	------	0	6	1	8	0	2	0	1	3
Camden, N. J.	0	0	1	1	1	0	1	1	2	0	0	8
Charleston, S. C.	1	0	2	0	0	0	1	0	0	0	0	0
Chicago, Ill.	7	0	2	1	9	3	20	8	36	0	4	120
Cincinnati, Ohio	2	0	------	0	0	0	2	2	19	0	0	15
Cleveland, Ohio	3	0	6	0	0	1	9	1	26	0	0	45
Concord, N. H.	0	0	----	0	1	0	0	0	0	0	0	0
Cumberland, Md.	0	0	------	0	0	0	0	0	0	0	0	0
Dallas, Tex.	7	0	------	0	0	0	0	0	4	0	0	5
Denver, Colo.	11	1	13	1	6	0	5	2	4	0	0	10
Detroit, Mich.	6	0	----	2	6	0	8	0	23	0	1	84
Duluth, Minn.	0	0	------	0	0	0	2	0	0	0	0	7
Fall River, Mass.	0	0	-----	0	0	0	0	0	9	0	0	3
Fargo, N. Dak.	0	0	------	0	0	0	0	1	0	0	0	0
Flint, Mich.	0	0	-----	0	0	0	1	2	5	0	0	11
Fort Wayne, Ind.	0	0	------	0	0	0	2	0	0	0	0	0
Frederick, Md.	0	0	------	0	0	0	0	0	0	0	0	0
Galveston, Tex.	0	0	------	0	0	0	0	0	0	0	0	0
Grand Rapids, Mich.	0	0	------	0	0	0	0	0	1	0	0	5
Great Falls, Mont.	0	0	------	0	1	0	0	0	0	0	0	2
Hartford, Conn.	0	0	------	0	0	1	0	0	0	0	2	7
Helena, Mont.	0	0	------	0	0	0	0	0	0	0	0	0
Houston, Tex.	6	0	1	0	0	0	2	0	1	0	1	3
Indianapolis, Ind.	2	0	------	0	0	0	3	0	9	0	0	23
Kansas City, Mo.	0	0	------	0	3	0	3	0	13	0	1	1
Kenosha, Wis.	0	0	------	0	0	0	0	0	2	0	0	3
Little Rock, Ark.	0	0	2	0	0	0	1	0	0	0	0	0
Los Angeles, Calif.	5	0	7	2	9	4	8	5	11	0	0	23
Lynchburg, Va.	0	0	------	0	0	0	1	0	0	0	0	1
Memphis, Tenn.	0	0	------	1	1	0	2	1	7	0	1	13
Milwaukee, Wis.	0	0	------	0	12	0	4	0	12	0	0	44
Minneapolis, Minn.	1	0	------	2	2	1	5	3	9	0	0	2
Missoula, Mont.	0	0	------	0	0	0	1	0	0	0	0	0
Mobile, Ala.	4	0	------	1	0	0	2	0	2	0	0	0
Nashville, Tenn.	0	0	------	0	1	0	1	0	1	0	0	0
Newark, N. J.	0	0	3	0	12	0	4	3	3	0	0	10
New Haven, Conn.	0	0	------	0	0	0	0	0	1	0	0	10
New Orleans, La.	0	0	1	1	0	0	3	1	3	0	4	0
New York, N. Y.	9	1	15	0	10	8	46	7	55	0	3	113
Omaha, Nebr.	1	0	------	0	2	0	2	0	6	0	0	1
Philadelphia, Pa.	0	0	4	3	47	1	16	4	34	0	2	74
Pittsburgh, Pa.	0	0	1	1	2	2	12	0	5	0	1	18
Portland, Maine	0	0	------	0	3	1	1	0	1	0	0	12
Providence, R. I.	1	0	------	0	7	0	5	0	2	0	0	23
Pueblo, Colo.	0	0	------	0	0	0	3	0	0	0	0	0
Racine, Wis.	0	0	------	0	1	0	1	0	9	0	0	3
Raleigh, N. C.	0	0	------	0	1	0	1	0	0	0	0	0
Reading, Pa.	0	0	------	1	0	0	2	0	0	0	0	5
Richmond, Va.	0	0	------	0	0	0	1	0	2	0	0	4

See footnotes at end of table.

City reports for week ended October 10, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va.	0	0	------	0	0	0	0	0	2	0	0	0
Rochester, N. Y.	0	0	------	1	1	0	1	1	4	0	0	15
Sacramento, Calif.	2	0	1	1	1	0	0	0	1	0	1	5
Saint Joseph, Mo.	1	0	------	0	0	0	2	0	1	0	0	0
St. Louis, Mo.	1	0	------	0	1	0	9	1	12	0	1	13
Saint Paul, Minn.	0	0	------	0	0	0	5	0	4	0	0	7
Salt Lake City, Utah	0	0	------	0	17	0	3	2	2	0	0	7
San Antonio, Tex.	0	0	------	0	0	0	1	3	2	0	0	2
San Francisco, Calif.	2	1	------	1	14	2	5	0	3	0	0	11
Savannah, Ga.	0	0	1	0	0	0	1	0	0	0	0	1
Seattle, Wash.	3	0	------	0	1	0	5	1	0	0	0	6
Shreveport, La.	2	0	------	0	0	0	0	0	1	0	1	0
South Bend, Ind.	0	0	------	0	0	0	0	0	0	0	0	1
Spokane, Wash.	0	0	------	0	3	0	0	0	4	0	0	0
Springfield, Ill.	0	0	------	0	1	0	2	0	2	0	0	11
Springfield, Mass.	1	0	------	1	0	0	2	0	31	0	0	5
Superior, Wis.	0	0	------	0	0	0	0	0	6	0	0	0
Syracuse, N. Y.	0	0	------	0	1	0	2	0	1	0	0	13
Tacoma, Wash.	0	0	------	0	16	0	1	0	17	0	0	1
Tampa, Fla.	0	0	1	1	1	0	2	0	1	0	0	1
Terre Haute, Ind.	1	0	------	0	0	0	4	0	1	0	0	0
Topeka, Kans.	0	0	------	0	1	0	2	0	0	0	0	0
Trenton, N. J.	1	0	------	0	1	0	0	0	3	0	0	2
Washington, D. C.	3	0	------	0	2	0	14	1	14	0	1	16
Wheeling, W. Va.	0	0	------	0	1	0	0	0	0	0	0	4
Wichita, Kans.	0	0	------	0	1	0	2	0	14	0	0	2
Wilmington, Del.	1	0	------	1	0	0	6	1	1	0	0	0
Wilmington, N. C.	1	0	------	0	0	0	0	0	0	0	0	0
Winston-Salem, N. C.	0	0	------	0	0	0	0	0	1	0	1	2
Worcester, Mass.	0	0	------	0	1	0	7	0	5	0	0	19

Anthrax—Cases: Camden, 1; Philadelphia, 1.
Dysentery, amebic—Cases: Detroit, 1; New York, 4.
Dysentery, bacillary—Cases: Baltimore, 1; Chicago, 5; Detroit, 6; Los Angeles, 4; New York, 23; Richmond, 1; St. Louis, 1.
Typhus fever—Cases: Atlanta, 1; Detroit, 2; Houston, 4; New Orleans, 1; Savannah, 1; Tampa, 3.

Rates (annual basis) per 100,000 population, for the group of 87 cities in the preceding table (estimated population, 1942, 33,744,106)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Week ended Oct. 10, 1942	13.44	10.82	3.71	33.69	45.89	80.20	0.00	4.33	149.73
Average, 1937–41	14.99	8.59	2.19	[1] 35.60	48.41	68.24	0.31	7.18	156.94

[1] Median.

PLAGUE INFECTION IN TACOMA, WASH.

Under date of October 16, 1942, plague infection was reported proved in 2 pools of fleas from rats, *Rattus norvegicus*, in Tacoma, Wash., one pool of 177 fleas from 105 rats collected on September 22 and 23, and the other of 35 fleas from 30 rats collected on September 24 and 25.

TERRITORIES AND POSSESSIONS

Panama Canal Zone

Notifiable diseases—July 1942.—During the month of July 1942, certain notifiable diseases were reported in the Panama Canal Zone, and terminal cities, as follows:

Disease	Panama		Colon		Canal Zone		Outside the Zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	8		1		3				12	
Diphtheria	5		6		7		4		22	
Dysentery (amebic)	3		1		3	1	2	1	9	2
Dysentery (bacillary)					2		4	4	6	4
Malaria [1]	34	3	3	1	948	1	273	4	1,258	9
Measles	2		3		29		1		35	
Meningitis meningococcus	1		1		2		3		7	
Mumps	1				4				5	
Paratyphoid fever	1				1				2	
Pneumonia		13		6	89	1		5	[2] 89	25
Smallpox (alastrim)					1				1	
Trachoma	1								1	
Tuberculosis		14		4	13			9	[2] 13	27
Typhoid fever	1								1	
Whooping cough					3				[2] 3	

[1] Includes 177 recurrent cases.
[2] Cases reported in the Canal Zone only.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended September 26, 1942.—During the week ended September 26, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		1	1	1	1		1		2	7
Chickenpox		9	8	28	50	8	14	4	44	160
Diphtheria		10		26		10	5			51
Dysentery				28	1					29
German measles		1		4	10		1	1	2	19
Influenza		14			4	1				19
Lethargic encephalitis						1				1
Measles		1		18	12		8	6	2	47
Mumps		12	2	11	145	10	22	9	101	312
Pneumonia		4			11				4	19
Poliomyelitis	1	15	6	8	4	2	1		7	44
Scarlet fever		6	4	63	46	4	27	19	23	189
Trachoma									1	1
Tuberculosis	5	3	22	101	48	9		16	32	236
Typhoid and paratyphoid fever		1	2	15		5	1	1	1	26
Undulant fever				1	1				1	3
Whooping cough		7		243	89	17	6	41	25	428
Other communicable diseases		14		4	257	46	1	1	1	324

COSTA RICA

Communicable diseases—June 1942.—During the month of June 1942, certain communicable diseases were reported in Costa Rica as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	20		Typhoid and paratyphoid fever	23	3
Measles	392	2	Whooping cough	50	

FINLAND

Communicable diseases—July 1942.—During the month of July 1942, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	170	Poliomyelitis	4
Dysentery	1	Scarlet fever	237
Influenza	282	Typhoid fever	102
Paratyphoid fever	100		

GREAT BRITAIN

England and Wales—Infectious diseases—13 weeks ended July 4, 1942.—During the 13 weeks ended July 4, 1942, cases of certain infectious diseases were reported in England and Wales as follows:

Disease	Cases	Disease	Cases
Diphtheria	8,779	Puerperal pyrexia	2,214
Dysentery	1,747	Scarlet fever	14,571
Ophthalmia neonatorum	1,197	Typhoid and paratyphoid fever	202
Pneumonia	11,653		

England and Wales—Vital statistics—Second quarter 1942.—The following vital statistics for the second quarter of 1942 for England and Wales are taken from the Quarterly Return of Births, Deaths, and Marriages, issued by the Registrar-General and are provisional:

	Number	Annual rate per 1,000 population
Live births	167,557	16.2
Stillbirths	5,752	.56
Deaths, all causes	116,834	11.3
Deaths under 1 year of age	7,820	[1] 47
Deaths from diarrhea (under 2 years of age)	714	[1] 4.3

[1] Per 1,000 live births.

SWITZERLAND

Notifiable diseases—June 1942.—During the month of June 1942, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	14	Poliomyelitis	56
Chickenpox	215	Scarlet fever	199
Diphtheria	89	Tuberculosis	278
German measles	36	Typhoid fever	5
Measles	1,068	Undulant fever	12
Mumps	101	Whooping cough	103
Paratyphoid fever	57		

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January–July 1942	August 1942	September 1942—week ended—			
				5	12	19	26
ASIA							
Ceylon	C	82	20				
China:							
Kunming (Yunnanfu)	C	[1] 763					
Shanghai	C	1					
India	C	39,170	6,990				
Calcutta	C	1,745	222	23			
Chittagong	C	55					
Rangoon	C	1					
India (French)	C	10					

[1] From May 12 to June 20, 1942.

PLAGUE

[C indicates cases; P. present]

Place		January–July 1942	August 1942	September 1942—week ended— 5	12	19	26
AFRICA							
Basutoland	C	10					
Belgian Congo	C	3	1				
British East Africa:							
Kenya	C	593	63	2			
Nairobi	C	64					
Uganda	C	305	13	2			
Egypt: Port Said	C	2	1				
Madagascar	C	84	7		1		
Morocco	C	277	35	9	3	1	
Senegal	C		[1] 5		1		
Union of South Africa	C	68					
ASIA							
China.[2]							
India	C	438	1				
Indochina (French)	C	70	2		1		
Palestine: Haifa	C	4	1				
EUROPE							
Portugal: Azores Islands	C	1					
NORTH AMERICA							
Canada: Alberta Province—Plague-infected fleas		P					
SOUTH AMERICA							
Argentina: Cordoba Province	C	7					
Brazil:							
Alagoas State	C	3					
Pernambuco State	C	6					
Chile: Valparaiso	C	1					
Peru:							
Ancash Department	C	6					
Lambayeque Department	C	3					
Libertad Department	C	6	1				
Salaverry—Plague-infected rats		P					
Lima Department	C	52	1				
Lima	C	17	1				
Piura Department	C	15					
OCEANIA							
Hawaii Territory: Plague-infected rats		27	15				1
New Caledonia	C				[3] 1		

[1] Includes 4 suspected cases.

[2] Plague has been reported in China as follows: Chekiang Province, Apr. 1–10, 1942, 4 cases; Fukien Province, Jan. 1–Apr. 5, 1942, plague appeared in 11 localities; Hunan Province, weak ended Apr. 18, 1942, 2 cases; Suiyuan Province, pneumonic plague appeared in epidemic form during the period Jan. 1–Apr. 4, in the northwestern area.

[3] Pneumonic.

SMALLPOX

[C indicates cases]

Place		January–July 1942	August 1942	September 1942—week ended— 5	12	19	26
AFRICA							
Algeria	C	597	32				
Belgian Congo	C	821					
British East Africa: Tanganyika	C	19	2	11			
Dahomey	C	56					
French Guinea	C	76					
Gold Coast	C	1,065			108		
Ivory Coast	C	50					
Morocco	C	1,275	66	4	22	5	
Nigeria	C	1,372	194	63	53	79	
Niger Territory	C	772			212		
Portuguese East Africa	C	7	3	5			
Senegal	C	17					
Sudan (French)	C	213			22	31	
Tunisia	C	1					
Union of South Africa	C	567	10				
Zanzibar	C	[1] 2					
ASIA							
Ceylon	C	7					
China	C	9					
India	C	18,742	747				
Indochina (French)	C	2,750	158				[2] 254
Iran	C	50					
Iraq	C	209	16				
Trans-Jordan	C	2					
EUROPE							
France:							
Seine Department	C	44					
Unoccupied zone	C	13					
Great Britain:							
England and Wales	C	5					
Scotland	C	45	8				
Portugal	C	36	4	4	1	1	
Spain	C	191	9	1			
Turkey	C		105	51	32	30	110
NORTH AMERICA							
Canada	C	4					
Mexico	C	42	17				
Panama Canal Zone	C	[3] 1					
SOUTH AMERICA							
Brazil	C	1					
Colombia	C	444					
Peru	C	1,147					
Venezuela (alastrim)	C	110					

[1] Imported.
[2] For the month of September
[3] In the Canal Zone only.

TYPHUS FEVER

[C indicates cases]

Place		January–July 1942	August 1942	September 1942—week ended— 5	12	19	26
AFRICA							
Algeria	C	33,827	723				
Basutoland	C	32					
British East Africa: Kenya	C	12	2	4			
Egypt	C	22,172	325	52	32		
Ivory Coast	C	4					
Morocco	C	25,118	428	40	29	26	25
Nigeria	C	5					
Niger Territory	C	1					
Senegal	C	[1] 3					
Sierra Leone	C	7					
Tunisia	C	15,427	429		[2] 133		
Union of South Africa	C	507					
ASIA							
China	C	145					
India	C	7					
Iran	C	641					
Iraq	C	83	7				
Palestine	C	22	28	11	21		
Syria	C	22					
Trans-Jordan	C	5					
EUROPE							
Bulgaria	C	631	2		1		
Czechoslovakia	C	5					
France:							
Seine Department	C	1					
Unoccupied zone	C	226	2				
Germany	C	2,043					
Hungary	C	713	12	5	2	8	
Irish Free State	C	9	6				
Portugal	C	1					
Rumania	C	3,341	53	7	7	25	
Spain	C	3,865	5				
Canary Islands	C	1					
Switzerland	C		1				
Turkey	C	270	35	3	8	9	8
Union of Soviet Socialist Republics	C	67					
NORTH AMERICA							
Guatemala	C	114	7				
Jamaica	C	30	2				
Mexico	C	459	39				
Panama Canal Zone	C	1					
Puerto Rico	C	3					
SOUTH AMERICA							
Chile	C	49					
Colombia	C	1					
Ecuador	C	51	18				[3] 26
Peru	C	923					
Venezuela	C	16					
OCEANIA							
Australia	C	27					
Hawaii Territory	C	31	3			4	

[1] Suspected.
[2] For the period Sept. 1–10, 1942.
[3] For the month of September.

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January-July 1942	August 1942	September 1942—week ended—			
				5	12	19	26
AFRICA							
Belgian Congo: Libenge	D	[1] 1					
British East Africa: Kenya	C	1					
French West Africa	C	1					
Gold Coast	C	[2] 2				[1] 1	
Ivory Coast [3]	C	[2] 2		[1] 2		[1] 1	[1] 1
Nigeria	C		1				
Senegal [4]	D		1				
Sierra Leone: Freetown	C	[1] 2					
Sudan (French)	D	1				[1] 1	
Togo: Hohoe	C	1					
SOUTH AMERICA [5]							
Brazil:							
Acre Territory	D	4					
Bahia State	D	1					
Para State	D	1					
Colombia:							
Boyaca Department	D	5					
Cundinamarca Department	D	3	1				
Intendencia of Meta	D	3					
Santander Department	D	2	2				

[1] Suspected.
[2] Includes 1 suspected case.
[3] During the week ended Oct. 17, 1942, 1 death from yellow fever was reported in Dimbokro, Ivory Coast.
[4] According to information dated Feb. 9, 1942, 15 deaths from yellow fever among Europeans have occurred in Senegal.
[5] All yellow fever in South America is of the jungle type unless otherwise specified.

MEDICAL STUDY OF MEN EXPOSED TO CARBON MONOXIDE[1]

A Review

Medical examinations of 156 traffic officers who had been on duty at the Holland Tunnel for 13 years and 4 months were made as a practical test of the effectiveness of the medical and engineering control methods set up for their protection. About half of these officers had been on tunnel duty every working day of this period. The carbon monoxide concentration to which traffic officers are exposed in the tunnel varies, of course, with traffic conditions, but the average exposure throughout all parts of the tunnels and for all hours of the day is probably not far from 0.7 parts of CO per 10,000 parts of air (70 p. p. m.). A few had worked as toll collectors. Their carbon monoxide exposure varied with traffic conditions and with wind velocity, but the results of several tests indicated that their heaviest exposure during peak traffic is not likely to average much more than 0.7 parts of CO per 10,000. Other men were assigned to the emergency garage, to desk duty, or to outside duty, all of them in places where the occupational exposure to carbon monoxide was negligible.

Included in the medical findings under discussion here are the results of examinations of the same men conducted by Surgeon A. L. Murray and Senior Surgeon A. E. Russell in 1932 after the officers had been on duty for 5 years.

At each examination the men, considered as a group, were found to be in excellent physical condition. There were no health impairments which because of their unusual nature, their excessive prevalence, or their severity would have signalized the presence of an occupational disease. Special search was made for signs and symptoms attributable to carbon monoxide intoxication and for the sequelae of acute episodes. No evidence of any such conditions was found.

[1] Sievers, Rudolph F., Edwards, Thomas I., and Murray, Arthur L.: A medical study of man exposed to measured amounts of carbon monoxide in the Holland Tunnel for 13 years. Public Health Bulletin No. 278. Government Printing Office, 1942. Available from the Superintendent of Documents, Washington, D. C., at 15 cents per copy.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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Public Health Reports

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Public Health Reports

Vol. 57 • NOVEMBER 6, 1942 • *No. 45*

A SUMMARY OF CENSUS DATA ON WATER TREATMENT PLANTS IN THE UNITED STATES [1]

By S. R. Weibel, *Passed Assistant Sanitary Engineer, United States Public Health Service*

Concurrently with the Nation-wide census of sewerage systems in the continental United States begun in February 1939, a summary of which has been published in Public Health Reports, March 20, 1942 (Reprint No. 2363), the United States Public Health Service has conducted a similar census of water treatment plants.

The data on which the census has been based were furnished by the sanitary engineering divisions of the various States on data forms for individual plants, distributed through the district offices of the United States Public Health Service. The completed individual forms were returned to the Cincinnati station, where the material was condensed and compiled on tabulation forms, copies of which were sent back to the respective States for checking. The checked and corrected material was then mimeographed and arranged in individual pamphlets by States, for general distribution.

Grateful acknowledgment is due to the personnel of these organizations, who have collaborated both willingly and effectively in the very considerable task of furnishing basic data in detail for the individual plants, at a cost of much time and effort. In some instances the records of the divisions were made available to representatives of the Public Health Service for transcription.

As the checked tabulations were received throughout the year 1941 and in one instance in early 1942, the mimeographed booklets for water treatment plants represent substantially the close of 1940, with 1941 data included in some States.

Each mimeographed booklet presents a tabulation of individual plants in the State serving communities of a resident population of 100 or more. The tabulations show for each plant the population of

[1] From the Division of Public Health Methods, National Institute of Health.

communities served, plant ownership, sources of supply, date started, rated capacity, population served, output, treatment facilities or practices, laboratory control where furnished by a plant, and water storage capacity.

In addition, most plants are identified as to principal functional use, such as purification, softening, iron and manganese removal, etc. With a few modifications, these classifications have been used in the summaries herein presented.

The assembly, compilation, and presentation of detailed data in mimeographed pamphlets for each State was organized and conducted by Passed Assistant Sanitary Engineer Vernon G. McKenzie at the United States Public Health Service Stream Pollution Investigations Station at Cincinnati.

The summary has been divided into five tables for convenience in presentation, table 1 being a general integration of the classified plants given in tables 2, 3, and 4, together with information on communities, ownership, and sources of supply. Tables 2, 3, and 4 contain the classified tabulations of plants, together with their respective populations served, output, and percentage capacity operation, where such information was substantially complete. Table 5 presents an independent summarization of selected facilities or practices of interest drawn from all types of plants.

In summarizing the census data it became evident that, because of omissions of basic data on population served and output for many of the individual plants, a complete and useful summary of these items for some States could not be given at this time. For most States these items were fairly complete and by filling in the small percentage of omissions encountered in these cases a more complete and substantially correct summary has been made possible for the bulk of the States. Omissions in population served were supplied from the population of the individual community and the output, estimated as 100 gallons per capita per day, applied to the population served. A similar procedure was followed in the case of a few capacities supplied in terms of output figures.

Enumeration of plants by number under general classifications and selected facilities is fairly complete for the country as a whole. The cases of omissions due to lack of detail are covered in the footnotes. In cases of communities supplied by two or more plants of dissimilar classification, the total population served has been in general allocated to the separate plants in proportion to their respective outputs. In the absence of these figures, or where output was also reported as a total figure, the break-down was made on the basis of capacity. A few cases in which such procedure was not considered practicable are

covered by footnotes. Plant ownership figures in some instances fall short of the total number of plants reported because of the omission of plants with ownership unknown and cases in which "both" types of ownership were reported. It is hoped, by subsequent annual supplements and revisions, to iron out such difficulties and gradually to complete, so far as possible, the basic information on all plants.

Table 1 is in the nature of a general summary of population, sources of supply, and treatment plants. From it some general observations may be drawn. Assuming the populations served, in 7 States and the District of Columbia, for which figures are lacking, to be approximately equal to the census populations of the communities served (shown in parentheses, table 1), the total population served by community water treatment plants in continental United States is about 74,300,000, or equivalent to practically 100 percent of the urban and 56 percent of the total population according to the United States Census of 1940. Raw water supplies are drawn for treatment from surface sources at 2,618, or 49 percent of the total number of plants for which sources are known, 2,486, or 46 percent, from ground sources, and 262, or 5 percent, from combinations of both surface and ground sources. On the basis of the 62,500,000 population served in 41 States for which this information is available, 73 percent received treated water from surface sources, 19 percent from ground sources, and 8 percent from combinations of the two. It may be mentioned in this connection that, in order to avoid duplication or confusion in the data presented, emergency or auxiliary plants and water supplies, where readily identified, were not enumerated. It may be that some of the supplies reported as both "surface" and "ground" result from the inclusion of a separate or auxiliary supply not thus identified.

Water treatment plants of all types considered total 5,372, of which, on the basis of known cases, 69 percent are municipally owned and 31 percent are privately owned.

Based on the 29 States for which both population served and total output figures are available, the 49,963,000 population served and 5,943 million gallons per day output indicate an average per capita plant output of 119 gallons per capita daily.

Tables 2, 3, and 4 present summaries of plants classified as to type or principal functions. With slight modification, these were adopted from the basic classifications of the mimeographed booklets giving the data for individual plants. The elements presented under each classification include number of plants, population served, plant output, and percentage capacity operation. These are summarized in table 1.

TABLE 1.—*General summary*

State	Population			Source of treated water supplies						Treatment plants—all types				
	U. S. Census of 1940		Estimated population served	Surface		Ground		Both		Number	Ownership		Rated plant capacity, million gallons per day	Plant output, million gallons per day
Name	Total	Urban		Number	Estimated population served	Number	Estimated population served	Number	Estimated population served		Public	Private		
Alabama	2,832,961	855,941	1,049,000	59	768,700	104	258,700	5	21,900	168	84	84	168	84
Arizona	499,261	173,981	(151,000)	3		16		4		23	10	12		
Arkansas	1,949,387	431,910	439,000	28	273,600	58	145,900	2	19,100	88	61	27		[illegible]
California	6,907,387	4,902,265	4,224,000	79	1,480,000	36	485,100	17	2,258,400	132	78	53		
Colorado	1,123,296	590,756	497,000	34	473,600	6	22,200	1	1,000	41	40	1	261	*108
Connecticut	1,709,242	1,158,162	1,474,000	70	1,448,600	10	21,600	2	3,700	82	26	56		104
Delaware	266,505	139,432	129,000	3	129,000	0		0		3	2	1	33	15
District of Columbia	663,091	663,091	(487,000)	2		0		0		2	2		160	
Florida	1,897,414	1,045,791	704,000	16	146,900	53	521,200	2	36,000	71	51	18	181	85
Georgia	3,123,723	1,073,808	927,000	70	672,000	93	243,300	4	12,100	167	138	29	185	108
Idaho	524,873	176,708	94,000	11	44,300	6	30,100	2	19,400	19	13	5		
Illinois	7,897,241	5,809,000	(5,804,000)	107		142		2		251	225	25		1,080
Indiana	3,427,796	1,887,712	1,795,000	45	1,097,000	140	616,500	2	81,000	187	142	44	460	156
Iowa	2,538,268	1,084,231	1,120,000	36	353,100	160	752,400	2	14,700	198	191	7		
Kansas	1,801,028	753,941	746,000	55	458,300	48	278,700	3	9,300	106	97	9	189	[illegible]
Kentucky	2,845,627	849,327	1,062,000	93	898,700	74	125,100	10	28,500	177	121	56		94
Louisiana	2,363,880	980,439	793,000	24	744,800	13	48,500	0		37	23	13	160	80
Maine	847,226	343,057	474,000	73	418,700	16	42,300	7	13,000	96	38	58		
Maryland	1,821,244	1,080,351	1,525,000	23	1,336,300	25	157,500	9	31,000	57	31	26		
Massachusetts	4,316,721	3,859,476	3,303,000	60	2,769,500	28	419,600	14	114,300	102	85	17		[illegible]
Michigan	5,256,106	3,454,867	(3,176,000)	67		26		*3		98	81	14		
Minnesota	2,792,300	1,390,098	1,144,000	30	710,100	41	145,800	1	287,700	72	68	4	438	104
Mississippi	2,183,796	432,882	251,000	3	104,000	27	114,800	1	32,000	31	20	3	43	31
Missouri	3,784,664	1,960,696	2,002,000	64	1,814,400	59	121,700	3	66,000	126	97	27	478	[illegible]
Montana	559,456	211,535	232,000	31	197,000	12	14,500	3	20,100	46	36	9		
Nebraska	1,315,834	514,148	(411,000)	8		21		0		29	27	2		
Nevada	110,247	43,291	(38,000)	4		3		1		8	3	5		
New Hampshire	491,524	283,225	278,000	29	189,600	11	73,800	4	14,300	44	32	12		
New Jersey	4,160,165	3,394,773	3,564,000	42	2,315,400	123	1,059,500	10	189,500	175	92	83		[illegible]
New Mexico	531,818	176,401	97,000	8	43,500	6	53,000	0		14	8	6	14	7
New York	13,479,142	11,165,893	11,566,000	271	8,934,000	135	1,502,000	*24	*1,130,000	431	298	119		[illegible]
North Carolina	3,571,623	974,175	1,175,000	121	1,084,100	41	89,800	1	600	163	137	19		
North Dakota	641,935	131,923	105,000	9	88,900	8	14,500	1	1,100	18	15	0		9
Ohio	6,907,612	4,612,986	4,530,000	85	3,476,800	139	966,700	5	86,100	229	204	25		[illegible]
Oklahoma	2,336,434	879,663	819,000	77	722,100	22	74,600	*4	*13,300	104	98	6		
Oregon	1,089,684	531,675	(528,000)	63		15		8		86	61	25		
Pennsylvania	9,900,180	6,586,877	8,122,000	326	6,967,000	206	675,300	71	479,700	603	204	391		[illegible]
Rhode Island	713,346	653,383	657,000	12	646,600	4	7,400	1	3,000	17	9	11		[illegible]

South Carolina	1,899,804	466,111	553,000	40	462,100	23	80,600	2	10,200	65	58	7	120	58
South Dakota	642,961	158,087	112,000	8	59,100	22	43,100	1	10,200	31	20	2	----	----
Tennessee	2,915,841	1,024,637	1,098,000	27	578,100	99	493,500	4	26,000	130	99	31	----	168
Texas	6,414,824	2,911,389	2,271,000	123	1,385,100	100	878,600	3	7,500	226	181	45	----	----
Utah	550,310	305,493	230,000	7	5,700	13	77,200	*2	*146,800	24	18	6	----	----
Vermont	359,231	123,239	61,000	7	58,700	1	2,000	0	----	8	6	2	----	6
Virginia	2,677,773	944,675	(1,196,000)	74	----	73	----	6	----	153	101	51	----	----
Washington	1,736,191	921,969	1,067,000	59	736,700	23	244,000	7	85,900	89	59	27	----	306
West Virginia	1,901,974	534,292	787,000	100	523,100	134	259,100	6	4,600	240	78	162	----	86
Wisconsin	3,137,587	1,679,144	1,363,000	21	976,200	66	378,600	1	8,000	88	81	7	409	158
Wyoming	250,742	93,577	88,000	11	39,900	5	24,600	1	23,500	17	13	8	43	16
	131,669,275	74,421,133	74,308,000	2,618	45,631,300	2,486	11,563,400	262	5,309,500	5,372	3,668	1,645	3,346	7,008

See footnotes at end of table 5

TABLE 2.—*Classified plant summary—Rapid sand filter purification plants*

State	Purification				Combined purification and iron and manganese removal				Combined purification and softening				Combined purification, iron and manganese removal and softening			
	Number	Estimated population served	Plant output, million gallons per day	Per-cent of capacity	Number	Estimated population served	Plant output, million gallons per day	Per-cent of capacity	Number	Estimated population served	Plant output, million gallons per day	Per-cent of capacity	Number	Estimated population served	Plant output, million gallons per day	Per-cent of capacity
Alabama	63	677,300	50.69	55	0				0				0			
Arizona	(*)				0				0				0			
Arkansas	29	293,200	22.27	48	1	500	0.05		0				0			
California	*35	861,100			0				0				0			
Colorado	23	346,600	75.42	38	0				0				0			
Connecticut	20	*327,800	36.38	68	0				0				0			
Delaware	2	*7,000	*.35	*58	0				0				0			
District of Columbia	1				0				0				0			
Florida	*9	87,100	10.53	29	0				5	128,300	14.66	59	0			
Georgia	71	667,300	78.96	60	2	10,800	90	39	1	6,000	1.50	65	0			
Idaho	3	14,900	4.62	57	0				0				0			
Illinois	93		66.03	39	0				8		18.96	47	3		11.08	97
Indiana	38	†582,100	†74.07	†52	0				1	100,000	11.10	46	1	7,800	.90	45
Iowa	27	192,700	15.44	45	0				6	128,300	11.00	41	0			
Kansas	40	277,400	32.04	53	0				17	174,700	17.19	38	0			
Kentucky	95	902,100	85.35	37	0				3	5,500	.16	14	0			
Louisiana	5	97,600	7.42	41	0				16	618,600	63.24	47	0			
Maine	13	75,300	7.72	36	0				0				0			
Maryland	*3	1,117,400	119.00		0				0				0			
Massachusetts	9	292,700	26.38	55	0				0				0			
Michigan	32		333.76	45	0				10		37.83	41	0			
Minnesota	11	372,800	35.88	17	0				7	309,000	23.00	49	0			
Mississippi	4	136,000	11.45	53	0				0				0			
Missouri	69	1,841,600	229.00	52	0				5	44,500	3.83	29	0			
Montana	8	72,200	19.27	48	0				2	10,600	1.25	31	0			
Nebraska	7				0				0				0			
Nevada	1	3,000	1.50	130	1	600	.06	24	1	2,500	1.50	100	0			
New Hampshire	6	16,200	1.73		0				0				0			
New Jersey	*28	1,232,700	107.25		0				0				0			
New Mexico	3	8,500	.32	77	0				0				0			
New York	96	1,891,200	269.81		1	3,200	.40	19	0				0			
North Carolina	92	883,600			0				1	1,800			0			
North Dakota	6	26,500	2.56	62	0				5	70,800	6.16	32	0			
Ohio	53	2,306,800	265.96	48	0				33	1,261,300	129.81	42	0			
Oklahoma	**34	185,300			0				x2	216,700			0			
Oregon	15				0				0				0			
Pennsylvania	162	2,809,300	299.16		3	169,200	11.05		14	372,100	27.83		0			

Rhode Island	8	567,800	45.14	42	0				0				0			
South Carolina	40	391,900	39.70	50	0				0				0			
South Dakota	5	33,500	2.65	33	0				3	30,200	2.62	41	0			
Tennessee	*36	628,500	61.90	43	0				0				0			
Texas	70	1,249,500			0				3	39,400			0			
Utah	3	1,900			0				0				0			
Vermont	2	27,300	1.73	58	0				0				0			
Virginia	*55				0				1				0			
Washington	8	34,600	7.80		0				0				0			
West Virginia	*81	389,800	28.75		0				**8	108,200	8.78		0			
Wisconsin	15	950,100	114.30	40	0				1	9,500	.47	23	0			
Wyoming	6	42,400	8.56	45	0				0				0			
	1,535	22,921,600	2,600.		8	184,300	12.		153	3,638,000	381.		4	7,800	12.	

See footnotes at end of table 5.

TABLE 3.—*Classified plant summary—Slow sand filter purification plants, iron and manganese removal and softening plants*

State	Slow sand filter purification				Iron and manganese removal				Softening				Combined iron and manganese removal and softening			
	Number	Estimated population served	Plant output, million gallons per day	Percent of capacity	Number	Estimated population served	Plant output, million gallons per day	Percent of capacity	Number	Estimated population served	Plant output, million gallons per day	Percent of capacity	Number	Estimated population served	Plant output, million gallons per day	Percent of capacity
Alabama	2	2,900	0.13	23	9	24,300	1.07	44	3	900	0.04	33	0			
Arizona	(*)				0				1				0			
Arkansas	0				34	68,800	4.53		1	2,300	.23	29	3	13,200	0.85	[illegible]
California	2	22,700			2	9,000			11	149,700			0			
Colorado	2	67,000	16.00	45	0				0				0			
Connecticut	6	285,300	26.62	71	0				0				0			
Delaware	1	(*)	(*)	(*)	0				0				0			
District of Columbia	1				0				0				0			
Florida	0				5	5,900	.56	20	16	196,700	28.82	62	2	20,800	2.06	68
Georgia	0				6	6,500	.62	42	3	13,600	1.18	32	0			
Idaho	0				0				0				0			
Illinois	0				30		7.03	56	5		2.10	33	53		13.33	41
Indiana	1	(†)	(†)	(†)	14	113,900	11.64	40	2	2,500	.09	10	10	26,200	2.59	35
Iowa	0				71	122,900	7.02	30	28	85,600	6.22	38	3	2,700	.10	25
Kansas	0				10	129,300	12.80	63	5	25,900	2.18	40	3	13,400	2.21	58
Kentucky	1	1,700	.07	65	5	9,400	.67	25	12	46,600	3.38	57	3	2,200	.07	37
Louisiana	*1	400	.40	80	3	18,800	1.69	45	11	55,700	6.98	53	0			
Maine	5	20,300	1.73		2	9,500	1.26		0				0			
Maryland	0				6	8,400	1.65		1	1,000			0			
Massachusetts	17	378,300	33.20	55	11	219,000	14.77	49	0				0			
Michigan	0				3		4.73		3				3		2.68	67
Minnesota	0				27	82,900	6.90	29	7	214,600	20.78	16	1	1,000	.08	14
Mississippi	0				12	47,200	3.44	52	0				1	700	.08	36
Missouri	1	400	.004	5	8	14,800	2.14	64	20	36,400	2.57	25	4	9,300	.74	42
Montana	0				0				1	800			0			
Nebraska	0				9				0				5			
Nevada	0				0				0				0			
New Hampshire	4	21,700	1.67		3	16,800	.99		0				0			
New Jersey	4	16,600	1.28		25	220,200	16.15		1	14,800	1.25		0			
New Mexico	0				1	35,000	2.50	42	0				0			
New York	29	305,500	34.81		16	†117,300	†10.36		11	33,000	2.21		0			
North Carolina	3	92,300			11	12,800			3	8,400			3	32,900		
North Dakota	0				2	2,800	.27		2	2,300	.18		1	800	.02	17
Ohio	0				26	66,300	4.11	36	61	271,400	15.37	32	16	60,700	4.20	44
Oklahoma	0				0				3	9,500			0			
Oregon	0				0				0				0			
Pennsylvania	14	2,338,500	362.05		4	7,100	.41		11	145,800	5.24		3	48,000	3.26	
Rhode Island	0				0				0				0			

[illegible]	[illegible]				[illegible]	14,200	1.15	50	2	11,200	.55	50	2	2,900	.13	[illegible]
South Dakota	0				6	11,500	.88	33	0				2	4,500	.23	[illegible]
Tennessee	0				12	299,500	25.92	42	0				0			
Texas	0				14	35,500			12	58,500			0			
Utah	0				0				0				0			
Vermont	1	6,600	1.50		0				0				0			
Virginia	0				3				5				0			
Washington	0				1	14,000	1.25	63	0				0			
West Virginia	0				4	[illegible],300	3.00		11	8,600	.42		8	53,500	3.82	
Wisconsin	1	8,000	1.30	81	19	80,100	7.04	42	6	12,000	.55	23	12	20,800	2.46	35
Wyoming	2	11,000	1.40	25	0				0				0			
	98	3,579,200	482.		456	1,892,000	157.		258	1,407,800	100.		138	317,600	39.	

TABLE 4.—*Classified plant summary—Simple chlorination and miscellaneous treatment*

State	Simple chlorination and miscellaneous treatment (with chlorination)											Miscellaneous treatment (without chlorination)								
					Adjunctive facilities											Treatment included				
	Number	Estimated population served	Plant output, million gallons per day	Percent of capacity	None	Aeration	Corrosion control	Sedimentation	Coagulation, sedimentation	Ammonia	Other	Number	Estimated population served	Plant output, million gallons per day	Percent of capacity	Aeration	Corrosion control	Sedimentation	Coagulation, sedimentation	Other
Alabama	86	334,600	31.99	49	73	5	5		1	3		5	9,300	0.52	25	5				
Arizona	19				16					3		0								
Arkansas	19	60,100	5.33	31	14	1		1	2	2		1	600	.03	33	1		1		
California	81	3,171,600			55	6	1	4	11	10	**2	0								
Colorado	15	82,900	16.05	57	14				1			1	300	.10	100					*1
Connecticut	54	856,200	100.63		45		5	1		3		2	4,600	.37			2			
Delaware	0											0								
District of Columbia	0											0								
Florida	18	200,100	22.71	46	10	7			1			15	61,800	4.99	30	15	2			
Georgia	75	218,000	22.37	55	66	1	5			1	**3	9	5,100	.32	18	2	8			
Idaho	16	78,900			14					1	*1	0								
Illinois	58		940.96		52		1			5		1		.50		1				
Indiana	120	587,100	61.96	33	109	5	3	1	2	3	**1	0								
Iowa	63	588,000			62				1	1	*1	0								
Kansas	21	111,600	12.63	26	20				1	1		10	14,000	1.32	28	10		10		
Kentucky	53	74,400	3.65		42	6	1	1	4	1		5	10,300	.82	21	4			1	*1
Louisiana	1	2,200	.22		0				1			0								
Maine	76	368,800			58		2		1	17	*1	0								
Maryland	27	172,500			22	1	2			3		7	12,800			6	6			
Massachusetts	54	2,339,900	215.22		45		5			4		11	73,400	5.04		1	11			
Michigan	47				41					6		0								
Minnesota	19	163,300	17.24	22	17					2		0								
Mississippi	10	62,400	5.04	41	6	3	3					4	4,500	.74	51	4	3			
Missouri	19	55,400	3.33	38	11	1		1	4	3		0								
Montana	36	147,900			33			1		2		0								
Nebraska	8				7				1	1	*1	0								
Nevada	5				3				2	2	*2	0								
New Hampshire	28	214,700			27		1					3	8,400				3			
New Jersey	108	2,007,500	242.21		99	6	4			3		9	69,700	5.59		7	4			
New Mexico	10	53,000	4.10	55	5			3		2		0								
New York	270	†1,552,300	†239.96		217	8	8	1	[illegible]	41	†3	8	112,800	11.25		3	8			
North Carolina	47	138,800			40	1	1			5		3	3,800			1	4			
North Dakota	1	700	.03	25	0			1				1	700				1			
Ohio	40	564,100	56.81		39					1		0								
Oklahoma	33	56,900			26			1	6			0								

Pennsylvania	386	2,215,700	291.63		357	11	6	2	2	12	*2	6	21,400	2.27		2	3		1	
Rhode Island	9	89,200	5.36		8		1					0								
South Carolina	7	97,600	8.77	34	4		3			1		9	35,100	2.31	23	4	7			
South Dakota	15	32,800			10					5		0								
Tennessee	77	160,900	14.05		69	4	3		5			4	7,500	1.36		3	1			
Texas	111	841,100			48	9	2	7	36	14	*3	16	47,200			10	1	2	5	*1
Utah	19	226,700			11			1	1	6		2	1,700			1				**1
Vermont	5	26,800	5.99		5							0								
Virginia	85				78	2	3	1		2	**1	1								†1
Washington	80	1,018,100	350.9		68		1		1	11		0								
West Virginia	86	153,500	11.15		78	3	5		1	2		3	4,500	.26		3				
Wisconsin	34	273,300	26.63	28	30	1	1			2	*	0								
Wyoming	8	33,100	5.50	31	7					1		1	1,500	.25				1		
	2,529	19,432,700	2,722.		2,117	83	73	49	87	194	21	138	511,000	38.		83	65	14	7	5

Table 2 consists of rapid sand filter purification plants, including those having adjunctive functions such as iron and manganese removal, softening, or both.

Table 3 includes slow sand filter purification plants, and other plants whose classified functional use is iron and manganese removal, softening, or both.

Table 4 consists of all plants not included in the above categories. These are subdivided into two miscellaneous groups, the one consisting of plants providing chlorination only, or chlorination plus other treatment short of rapid or slow sand filtration, and the other, plants providing similar miscellaneous treatment without chlorination. In connection with the latter group, it is to be pointed out that plants in tables 2 or 3 do not necessarily provide chlorination.

The percentage distribution of plants by number and population served for the 32 States [3] for which both figures are available is as follows:

Table	Classification	Percent of total by— Number	Percent of total by— Population served
2	Rapid sand filter purification plants	(34 4)	(53.1)
2	Purification (only)	30.6	44.0
2	Purification and iron and manganese removal	.2	.5
2	Purification and softening	3.6	8.6
2	Purification, iron and manganese removal, and softening	0	0
3	Slow sand filter purification plants	1.7	8.7
3	Iron and manganese removal plants	9.7	3.0
3	Softening plants	5.8	2.7
3	Combination iron and manganese removal and softening plants	1.9	.7
4	Simple chlorination and miscellaneous treatment (with chlorination)	43.8	31.1
4	Miscellaneous treatment (without chlorination)	2.7	.7
	Total for 32 States	100.0	100.0

Table 5 summarizes selected information drawn from all plants regardless of type or function. The items presented include chlorination, softening, iron and manganese removal, rapid sand filtration, ammoniation, activated carbon, and laboratory control (by plant laboratories). Additional details, such as type of aeration, mixing, sedimentation basins, coagulants used, application of chlorine or ammonia as gases or compounds, recarbonation and corrosion control practices, and water storage capacities, are available in the mimeographed booklets. Most of these items are not at present suitable for complete presentation by States, because of omissions in detail in many instances.

[3] Representing 65 percent of the 48 States and the District of Columbia, 64 percent of the total plants enumerated, and 50 percent of the total estimated population served.

TABLE 5.—*Summary of selected facilities at plants of all types*

State	Total plants all types		Chlorination		Softening				Iron and manganese removal		Rapid sand filtration				Ammonia	Activated carbon	Laboratory control (at plant)		
					Lime-soda		Zeolite				Gravity		Pressure						
	Number	Plant output, million gallons per day	Number	Plant output, million gallons per day	Number	Plant output, million gallons per day	Number	Plant output, million gallons per day	Number	Plant output, million gallons per day	Number	Plant output, million gallons per day	Number	Plant output, million gallons per day			Chemical	Bacteriological	Both
Alabama	168	84	162	83.87	0		3	0.04	9	1.07	65	51.48	6	0.24	4	3	60		2
Arizona	23		23		0		1		0		(*)		(*)		4	0			
Arkansas	88	33	59	31.46	4	1.08	0		38	5.43	41	24.74	7	.48	5	10			5
California	132		120		8		3		2		†22		18		19	10			
Colorado	41	108	34	103.20	0		0		0		**21	75.17	2	.25	0	0			
Connecticut	82	164	73	138.42	0		0		0		16	35.51	4	.87	6	4	9		7
Delaware	3	15	3	14.65	0		0		0		2	*.35	0		0	0			
District of Columbia	2		2		0		0		0		1		0		2	2			2
Florida	71	85	46	78.40	19	44.77	4	1.37	7	3.22	*21	*31.49	*3	*.43	16	10	11	1	7
Georgia	167	106	155	105.18	3	2.50	1	.18	8	1.52	*79	82.40	*3	35.93	15	7	38		25
Idaho	19		19		0		0		0		3	4.62	0		5	3	1		3
Illinois	251	1,060	193	1,053.00	34	40.58	35	4.89	86	31.44	124	112.53	56	11.18	35	80	120		58
Indiana	187	196	183	192.82	3	12.38	11	2.21	25	15.04	45	†94.80	11	1.43	24	29	13	8	22
Iowa	198		111		23	16.70	14	.62	74	7.12	**57	35.47	62	3.11	9	26	30		10
Kansas	106	80	84	75.56	25	21.58	0		13	15.01	69	63.52	4	.29	23	42	38		8
Kentucky	177	94	170	93.26	16	3.59	2	(†)	8	.74	104	88.71	9	.47	21	35	36		10
Louisiana	37	80	36	79.88	25	70.34	3		3	1.60	22	73.18	4	.60	3	4	19		4
Maine	96		96		0		0		2	1.26	9	7.11	5	1.56	22	3	1		1
Maryland	57		42		0		1		6	1.65	* 3	119.00	1	1.36	5	5			
Massachusetts	102	293	70	255.78	0		0		11	14.77	10	26.69	0		7	6	9		6
Michigan	98		92		13	49.54	3	(†)	6	7.41	43	382.71	2	1.04	28	29		18	42
Minnesota	72	104	42	78.82	13	45.75	2	.11	28	6.93	29	63.00	17	1.68	16	10			
Mississippi	31	21	25	19.62	0		1	.03	13	3.47	7	14.15	8	.64	1	0			
Missouri	126	242	107	238.59	19	6.07	10	.85	12	2.91	85	236.54	9	.54	22	37	31		26
Montana	46		46		2	1.25	1		0		10	20.52	0		14	5	4		2
Nebraska	29		19		4		1		14		16		4		3	4	1		
Nevada	8		8		1	1.50	0		1	.06	1	1.50	2	1.56	2	3			3
New Hampshire	44		33		0		0		3	.99	6	1.73	0		0	4	1		
New Jersey	175	375	143	362.64	0		1	1.25	25	16.14	26	87.61	27	36.81	35	11			
New Mexico	14	7	14	6.92	0		0		1	2.50	3	2.81	1	.01	3	1			
New York	431	1,567	365	† 423.95	0		11	2.24	9	† 10.75	† 70	251.33	† 35	31.25	82	* 67		17	72
North Carolina	168		147		4		3		14		90		12		29	37	12		77
North Dakota	18	9	14	9.00	7	6.34	1	.01	3	.29	13	8.94	0		6	4	2		4
Ohio	229	476	142	462.84	89	143.54	21	5.85	42	8.31	146	410.90	28	3.91	21	32	59	7	57
Oklahoma	104		**103		(†)		(†)		0		††32		4		10				
Oregon	86		85		0		0		0		* 8		* 8		17	8			

TABLE 5.—*Summary of selected facilities at plants of all types*—Continued

State	Total plants all types		Chlorination		Softening				Iron and manganese removal		Rapid sand filtration				Ammonia	Activated carbon	Laboratory control (at plant)		
					Lime-soda		Zeolite				Gravity		Pressure						
	Number	Plant output, million gallons per day	Number	Plant output, million gallons per day	Number	Plant output, million gallons per day	Number	Plant output, million gallons per day	Number	Plant output, million gallons per day	Number	Plant output, million gallons per day	Number	Plant output, million gallons per day			Chemical	Bacteriological	Both
Pennsylvania	603	1,003	588	999.24	†17	†28.66	†8	†5.48	10	14.72	179	563.95	8	9.22	49	56			
Rhode Island	17	51	17	50.50	0		0		0		6	44.20	2	.94	2	5	1		[illegible]
South Carolina	65	53	49	49.02	1	.50	3	.18	7	1.26	43	40.32	3	1.01	16	19	8		[illegible]
South Dakota	31		29		5	2.85	0		8	1.11	14	6.24	2	.14	9	2			
Tennessee	130	103	107	77.05	0		0		12	25.92	**32	61.26	5	.08	10	12	9		[illegible]
Texas	226		191		10		5		14		62		17		19	27	5	1	[illegible]
Utah	24		22		0		0		0		(†)		†3		6	0			
Vermont	8	9	6	7.52	0		0		0		2	1.73	0		0	1			
Virginia	153		152		1		5		3		*53		6		11	17	8		[illegible]
Washington	89	360	89	360.00	0		0		1	1.25	8	7.55	1	1.50	12	0	7	6	
West Virginia	240	56	202	54.49	22	9.98	6	3.04	49	6.81	†90	40.73	40	3.43	13	30	82	1	[illegible]
Wisconsin	88	153	59	149.85	9	2.54	10	.94	31	9.50	26	120.48	19	.91	13	11	14	5	[illegible]
Wyoming	17	16	13	14.13	0		0		0		4	8.08	2	.48	2	0	1		1
	5,372	7,003	4,590	5,670	377	510.	170	29.	598	220.00	4,818	3,303.	460	154.	676	720	599	64	[illegible]

Arizona:
*Total of 3 filter purification plants in State, type filters not specified.

California:
*Exclusive of 1 plant, population served estimated at 9,400, type filter not specified.
**Contact filter at 1 plant, activated carbon at other.
†Exclusive of 2 plants, type filter not specified.

Colorado:
*Filter only, type not specified.
**Exclusive of 1 plant, type filter not specified.

Delaware:
*Exclusive of Wilmington, total population served 122,000 and total output 14.3 million gallons per day furnished by a rapid sand filter plant and a slow sand filter plant.

Florida:
*Exclusive of 1 purification plant, capacity 0.51 million gallons per day, population served 3,500, output 0.15 million gallons per day, type filter not specified.
**Exclusive of 2 plants, type filters not specified.

Nevada:
*Activated carbon at both plants.

New Jersey:
*Exclusive of 1 purification plant serving 2,900, output 0.50 million gallons per day, type filter not specified.

New York:
*Exclusive of 1 source unknown, population served 240.
†Exclusive of New York City, data for complete allocation of population served and output to classified plants not at hand. Total population served 7,[illegible], total output 998 million gallons per day. Plants enumerated as 15 chlorination; 1 aeration, coagulation, sedimentation, and chlorination; and 8 iron and manganese removal plants, 7 of which have filters. Chlorination enumerated as 1 plant for some supply systems possibly consist of more than 1 plant.
††2 activated carbon, 1 contact filter.

Oklahoma:
*Exclusive of 1 source unknown serving 8,537.
**Exclusive of 30 purification plants serving 347,500, type filter not specified.

Georgia:
*1 plant 35.2 million gallons per day output with both gravity and pressure filters reported on both columns.
**Calcite sand filters.

Idaho:
*Coagulation, sedimentation, contact filter, and chlorination at 1 plant.

Indiana:
**Activated carbon.
†Exclusive of Indianapolis, total population served 375,000 and total output 33.5 million gallons per day furnished by 2 rapid sand filter plants, 1 slow sand filter plant, and untreated well supply.

Iowa:
*Activated carbon.
**Exclusive of 3 plants, type filter not specified.

Kentucky:
*Distillation.
†Output 1 plant 0.02, other unknown.

Louisiana:
*Plant also softens. 5 other slow sand filter plants in the State are classified functionally as softening plants only.

Maine:
*Contact filter.

Maryland:
*Exclusive of 13 purification plants, population served 212,700, output 23.93 million gallons per day, type filters not specified.

Michigan:
*Exclusive of 2 sources unknown.
†Output 1 plant 0.62 million gallons per day, other 2 unknown.

Nebraska:
*Activated carbon.

xExclusive of 2 purification-softening plants serving 2,700, type filter not specified.
xxExclusive of 1 unknown.
†7 plants soften, detail incomplete.
††Exclusive of 34 filters, type not specified.

Oregon:
*1 plant having both gravity and pressure filters carried in both columns.

Pennsylvania:
*Activated carbon.
†Exclusive of 3 plants, total output 2.28 million gallons per day, type softening not specified.

Tennessee:
*Exclusive of 1 purification plant serving 1,300, capacity 0.30 million gallons per day output 0.14 million gallons per day, type filter not specified.
**Exclusive of 8 plants, total output 21.50 million gallons per day, type filter not specified.

Texas:
*Charcoal filter.

Utah:
*Exclusive of 2 sources unknown serving 600.
**Filter only, type not specified.
†Of total of 4 filter plants in State, 3 are pressure type, other not identified.

Virginia:
*Exclusive of 3 purification plants, type filter not specified.
**Activated carbon filter for dechlorination.
†Granular carbon pressure filter.

West Virginia:
*Exclusive of 1 purification plant serving 400, output 0.005 million gallons per day, type filter not specified.
**Exclusive of 1 purification-softening plant serving 75, type filter not specified
†Exclusive of 3 plants, type filter not specified.

Referring to chlorination in table 5, it appears that 86 percent of the total number of plants provide chlorination. On a flow basis, about 94 percent of the total 6,005 million gallons per day for 30 States for which output data are available receives chlorination, as compared with 85 percent on the basis of number of plants. Referring to softening, it appears that on the basis of the number of plants, lime or lime-soda softening constitutes 69 percent and zeolite 31 percent in the 33 States softening. Twenty of the 33 States having softening practices give output figures showing that, whereas on a plant enumeration basis the percentage distribution is about the same as above (67 percent and 33 percent respectively), on the basis of plant output, lime or lime-soda softening is used for 94 percent of the output, as against 6 percent for zeolite, indicating the use of zeolite in small installations. The hypothetical average output for plants having softening in these same States is about 1.29 million gallons per day per plant for lime or lime-soda as against 0.18 million gallons per day per plant for zeolite.

Gravity or pressure rapid sand filters are identified at 2,278, or 42 percent of the total number of plants in the country. In the 30 States[3] in which rapid sand filters were completely identified and for which outputs were available, gravity filters are used in 82 percent of the installations and pressure in 18 percent of the installations. On a flow basis for the same plants, gravity filters handle 96 percent of the total output and pressure, 4 percent, indicating small pressure filter installations on the average.

Ammoniation is practiced at 676 plants, or 13 percent of the total plants surveyed and at 15 percent of all of the plants using chlorine. Activated carbon is used at 720 plants.

Plant laboratory control is reported for 1,286 plants, or 24 percent of the total plants, with a distribution of 47 percent chemical control, 5 percent bacteriological control, and 48 percent both.

Iron and manganese removal is practiced at 598 plants in 36 States, or in about 12 percent of the total plants in those States.

It is hoped to compile and issue annual supplements to the individual State booklets showing new installations and additions to existing plants and an annual summary similar to the one here presented. This provides the opportunity to complete gradually the detailed information on existing plants toward the ultimate objective of a complete, authentic, and up-to-date annual record of community water treatment in the United States. At intervals of 5 or 10 years, this information can be incorporated into a complete inventory of plant detail brought to date. Although some of this work may have to be curtailed during the war period, it is hoped that the plan indicated may be followed as an ultimate objective.

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[3] Includes New York State exclusive of New York City.

A CONTRIBUTION ON THE TOXICITY OF ALGAE [1]

By R. E. Wheeler, *Surgeon (R)*, James B. Lackey, *Senior Biologist*, and Stuart Schott, *Assistant Chemist, United States Public Health Service*

By comparison with the literature on the role of algae in causing tastes and odors in drinking water, the literature on the toxicity of algae is far from voluminous. The latter is to be found chiefly in veterinary publications and has been ably summarized by Fitch and several collaborators (*1*) in a paper describing an outbreak of fatal poisoning among turkeys, ducks, and geese after drinking from a lake where a thick scum of blue-green algae formed. Subsequently, Deem and Thorpe (*2*) reported a similar occurrence under comparable conditions. These authors report deaths in experimental animals (guinea pig, rabbit, and fowl) in a surprisingly short time after administration of algae (chiefly *Anabaena flosaquae* and *Microcystis flos aquae*) by mouth or parenterally. They report "foamy tears" as an agonal finding in guinea pigs.[2] Fitch et al. showed among other findings that the toxic substance was nonvolatile, was heat stable at 102–104° C. for 100 hours when dry but unstable at 100° C. when wet; that it does not migrate under an imposed electrical potential; that it can be dialyzed through collodion; and that "it can exist in the water around the algae, for the liquid separated from the algae is toxic." There is some evidence that the same algae may be toxic at one time and not at another—as though the toxic phase might be a stage of development or of decomposition.

One other contribution has been made recently on algal toxicity, namely, the paper of Sommer and his colleagues (*3*) on the discovery of a highly potent toxic substance in certain marine dinoflagellates. This substance was discovered during the course of studies on the toxicity of shellfish, the ingestion of which caused paralytic shellfish poisoning. The biochemical and physical properties of this poison, differing in some respects from those described by Fitch et al., are presented by Müller (*4*).

No human outbreaks have ever been traced to algal contamination of drinking water, although occasional mention is made of algal blooms in connection with outbreaks presumably waterborne for which bacterial explanations were not found (*5*). The little data available suggest that algal poisons work rather on the central nervous system than on the gastrointestinal tract. It seems probable that tastes and odors almost invariably associated with extensive algal pollution would impel humans to seek other sources of drinking water before imbibing

[1] From the Stream Pollution Investigations Station (Cincinnati, Ohio) of the Division of Public Health Methods, National Institute of Health.

[2] A finding not uncommon in guinea pigs with acetyl-choline poisoning is described by Tashiro (Tashiro S., Badger, E., Younker, W.: "Is Chromodachryorrhoea a Diapedesis of the Red Corpuscles?" Proc. Soc. Exp. Biol. and Med., 45: 377 (1940).

enough of the polluted water to be harmful. However, the veterinary experience justifies some effort at determining whether there may be a potential toxicity in algal pollution even though the practical risk may be slight. It should be noted that the presence of algae in drinking water, in addition to causing tastes and odors, may have some importance from the standpoint of the allergist as algae may, on occasion, liberate considerable amounts of protein in water. If allergic reactions to algal proteins do occur, they would be as uncommon as they would be obscure and hardly likely to occur as a public health problem. However, one important effect of algal growth in water must be that nutritive constituents for bacterial growth are afforded when the algae decompose. The biologist is well acquainted with the rise in bacterial population following the death of an algal bloom in a reservoir or in cultures. The present note is concerned primarily with the question of more direct types of toxicity.

EXPERIMENTS WITH FRESH MATERIAL

During the course of field trips in connection with the Ohio River Pollution Survey, samples were collected from bodies of water containing algal "water blooms." One of the first of these was obtained from a stock watering pond in northern Kentucky. The sample taken on September 18 contained a predominance of *Microcystis aeruginosa* and *Anabaena spiroides*. A second lot of material, collected on October 1, showed *Microcystis aerugonisa* almost exclusively and further samples collected on October 4, 7, and 15 contained the *Microcystis* only. After the middle of October cold weather put an end to the "bloom" and to the possibility of working with fresh material.

Through the cooperation of Dr. Theodore Olson, additional *Microcystis* material was obtained from a Minnesota bloom. Its properties proved to be nearly identical with those of the material collected locally.

Microcystis aeruginosa is one of the Myxophyceae or blue-green algae, a species which occurs in large irregular colonies. Sometimes individual colonies are large enough to be seen with the unaided eye. They consist of myriads of small cells, about 8 to 12 microns in diameter, loosely aggregated with a common gelatinous envelope whose periphery is usually free of cells but offers an attachment for other algae, bacteria, and protozoa, and is a matrix containing many bacteria. Any colony of *Microcystis aeruginosa* is, therefore, virtually a microcosm, but its vast bulk is composed of its own cells and the jelly they have secreted. Colonies are usually olive green, and a bloom of the species is olive green or green. Attempts were made to grow *Microcystis aeruginosa* in bacteria-free culture but these were unsuccessful, this being one of the algae not thus far grown success-

fully in pure culture in laboratory. The gelatinous envelope surrounding the algal colonies is, moreover, ideally suited for entangling or adsorbing bacteria so that enormous numbers of the bacteria must be injected with the algae when administered in the living state. This envelope could also serve as an "insulator" between the algae and the animal, limiting the exchange of poisonous substances from the former to the latter and retarding somewhat the break-down of the algal cells in their new environment.

However this may be, the results of experiments with fresh material were hardly dramatic or conclusive. The algae were filtered from the water of the samples and resuspended in just enough water to permit the material to flow through a 16-gage needle attached to a glass hypodermic syringe. The results may be briefly summarized as follows:

1. Mice receiving the algae subcutaneously or intraperitoneally invariably died when the dose was more than 0.25 ml. Death seldom occurred in less than 16 hours or in more than 36 hours.
2. One guinea pig given 2 ml. intraperitoneally died in 24 hours.
3. One rabbit given 5 ml. intraperitoneally showed no ill effects.
4. Guinea pigs given 4 ml. by mouth showed no ill effects.
5. Mice receiving the algae by mouth either by injection with a blunt needle passed along the esophagus directly into the stomach or by adding algae to the drinking water nearly always survived.
6. Injections of the pond water after filtering off the algae did not affect the anima's although the injected material contained re atively large numbers of bacteria.
7. Injections of other micro-organisms living in the pond—chiefly ciliates and flagellates—had no effect when given to mice intraperitoneally.

PRESERVATION OF ALGAL MATERIAL

Since a shortage of fresh material for further study was anticipated, attempts were made to preserve the algae. Two lots obtained on the seventh and fifteenth of October were tested for toxicity in mice and showed the usual delayed death. One lot concentrated by filtration was put in the freezing unit of the electric refrigerator where it quickly froze and remained frozen for 2 months. It never thawed appreciably even during defrosting. Another lot similarly concentrated was put in vials, quickly frozen in dry ice, dehydrated *in vacuo*, and sealed.

EXPERIMENTS WITH PRESERVED MICROCYSTIS AERUGINOSA

These methods of preservation caused a rather dramatic change in the toxicity of the material. When portions of the algae, which had been frozen in the refrigerator, were thawed out and injected, death occurred in mice within much shorter periods and the minimal lethal

dosage was found to be only 0.025 ml. Furthermore, the toxic substance had gone into solution, for filtrates of diluted frozen algae were found to be quite as toxic as when unfiltered material was used.

The two methods of preservation gave quite comparable results. When the dehydrated material was resuspended in the original volume of water, its toxicity was found likewise to have increased to exactly the same degree. Because control studies with the fresh material just prior to freezing had shown no accelerated death and no increase in toxicity, it is concluded that this enhancement did not take place prior to preservation.

When preserved material was given, death was seldom delayed in mice longer than an hour and a half after administration of the algae, and no death even with very large doses was ever observed to have occurred in less than 40 minutes. The shortest death time noted for guinea pigs was 3 hours and survival for more than 4 hours was noted for those receiving 1.0 and 2.0 ml. intraperitoneally. The syndrome of rapid death with "foamy tears" described by workers with other algae was not observed with this *Microcystis* material.

Most of the experiments to be outlined below were conducted with mice as the test animal, for they reacted very uniformly to various doses and types of material. The dosages were given subcutaneously. When more than the lethal dose of preserved material was given parenterally, mice behaved normally for half an hour, eating and drinking as usual. Then they had periods of apathy alternating with restlessness and exaggerated response to stimuli. During this interval the ears and tails became chalky white and the eyes considerably lighter pink in color. The final stage was one of rapid superficial respiration, the animal lying quietly with death determined only by the cessation of respiration.

When post mortem was done at once after respiration stopped there was no bleeding on cutting through the skin or abdominal wall. The heart ventricle was found to be quite contracted and colorless, but beating slowly. The auricles were dilated and beat twice or more for each ventricular beat, or quite dissociated from the ventricles. Invariably the liver was enormously dilated and dark. The intestines were contracted and the visceral circulation no more in evidence than the peripheral, except that the engorged liver bled profusely when incised.

Death in mice supervened too rapidly after subcutaneous injection to be explained by the hypothesis of bacterial invasion but the possibility of bacterial toxic action had to be considered. Four 'ots of algal material were accordingly prepared: (1) pasteurized at 80° C. for 20 minutes; (2) filtered through a Jenkins filter; (3) autoclaved at 15 pounds for 15 minutes; (4) unsterilized preserved material as a control. Bacteriological studies of the pasteurized material showed

10 colonies per ml., all being spore-formers. The filtered and autoclaved lots were sterile. Mice receiving uniform doses of all four types of material died and the time taken for death to supervene was fairly uniform. Subsequently it was determined that the toxic substance could be dialyzed through collodion sacs and through Fourex condoms, very little toxicity being demonstrable for the material in the sac after 18 hours. Therefore, the hypothesis of a bacterial toxin appeared to be unlikely.

As the toxic substance appeared to be of a chemical nature, an attempt was made to determine its properties as a clue to its identity. These facts were determined:

1. When the dialysate is concentrated *in vacuo* and the residue dried in a vacuum oven, an amorphous brown somewhat oily substance of high toxicity is obtained. The minimal lethal dose for mice was 0.0004 mg. No crystals were observed.

2. Extracts with water and alcohol are toxic but those with ether, benzene, or chloroform are not toxic.

3. The toxic substance is only stable to heating (boiling or autoclaving) in neutral solution and is destroyed by heat in 1 percent acid or alkaline solution.

4. There is no loss of toxicity in sterile (autoclaved) solutions over a period of a month but unsterile solutions gradually lose their potency.

5. The toxic substance readily adsorbs on activated carbon; when the carbon is filtered out the clear filtrate is nontoxic but the carbon residue is toxic for mice, the toxic action being somewhat delayed (10 hours).

6. The quinone test for amines, the Benedict test for carbohydrates, the Millon test for proteins, and the sodium picrate test for cyanides were all negative. However, because of the limited quantity of material available, these tests were run on dilute solutions and are not considered conclusive. On the basis of the solubility as determined from the toxicity of the extracts, the possibility that the toxicity was due to either of the cyanogenetic glucosides (*6*), amygdonitrile glucoside or amygdalin, can be ruled out.

Further attempts to determine the properties and nature of the toxic agent were impossible because of lack of material. It was thought that an organic ester such as acetylcholine might be involved but attempts to protect mice against toxic doses by simultaneously administering 1.3 mg. of atropin as an antidote failed. The sublethal dose of physostigmine for mice was found to be 0.013 mg. and this, combined with a sublethal dose of toxic material, did not show synergistic action. The acetylcholine hypothesis was therefore discarded.

Although the toxic substance was found to be comparatively inert when given by mouth to mice, an attempt was made to determine the extent to which it would survive in aqueous solutions subjected to

various types of water treatment. The limited amount of material available made it impossible to make these tests comparable to the treatment procedures in regular use in water treatment plants but the procedures were followed as nearly as could be done with laboratory equipment.

Water was added to preserved algae until a 10-percent suspension of the original volume was obtained. The minimal lethal dose of this suspension was found to be 0.25 ml. The material was then allowed to settle at 20° C. for 24 hours, the supernatant fluid decanted, coagulated with alum, and filtered through a Gooch crucible to remove the coagulum. The filtrate appeared to have enhanced toxicity, for on two separate occasions mice receiving the minimal lethal dose of 0.25 ml. died after very short intervals (40 minutes). This filtrate was then chlorinated on one occasion with 100 parts per million of chlorine for 12 hours and on another with 8.4 parts per million for 12 hours. Substantial chlorine residuals were demonstrated at the end of the period on both occasions. Mice receiving a 0.25 ml. dose of the material at this stage of the treatment died within the same short intervals noted for filtrate from alum treatment alone. However, when activated carbon in comparatively large amounts was added and the suspension filtered, no toxicity could be demonstrated in the filtrate in doses of 1.0 ml. Carbon added in the small amounts corresponding to those actually used in water treatment was distinctly less effective, death occurring with doses of 0.5 ml., but not with doses of 0.25 ml. Control mice which received corresponding dosages of alum, chlorine, and activated carbon showed no ill effects.

The above work was done with *Microcystis aeruginosa* from several sources. At the same time an effort was made to test other blue-green algae in the same way. One practically pure culture of *Aphanizomenon flos aquae* was obtained from Minnesota, and a second was collected locally. Local collections of *Anabaena spiroides* and of *Oscillatoria sp.*, both of approximately the same density and purity, were made. Each of these was treated in the same way as described for *Microcystis* before administration to mice. None of these harmed the mice, at least as far as was detectable, and certainly none were toxic as was the *Microcystis*. Evidently the toxic principle of *Microcystis aeruginosa* is not present in all blue-green algae.

DISCUSSION

The toxic effect described above does not appear to be a bacterial one. However, proof that the algae themselves are the source of the poison is not complete. The gelatinous envelope of *Microcystis* colonies would be an ideal adsorbing agent for any organic or inorganic poison in water and would tend to concentrate it markedly. Against this possibility is (a) the fact that freezing the material greatly

enhances its toxic action, and (b) algae collected on different dates showed slightly different toxicity, but this was found to be due to differences in the degree of concentration after collection. The dry weight of the minimal lethal dose was found to be fairly uniform.

The hypothesis of adsorption cannot be ruled out by these limited observations but it would appear unlikely. Similarly, the hypothesis of relatively stable toxic protein decomposition products due to bacterial action remains a possibility. If *Microcystis aeruginosa* could be grown on artificial media free of bacteria, these effects could be more definitely evaluated. However, lack of toxicity on such media would not necessarily mean that there is no toxicity when the alga is grown under natural conditions.

Because of the lack of toxicity of this substance when given by mouth and because of the definite delay in the development of toxic symptoms after subcutaneous injection, it is possible that a complex and essentially nontoxic organic compound is altered after injection and becomes toxic.

The alternative is that *Microcystis aeruginosa* contains, or on occasion may contain, a toxic substance *per se.*

SUMMARY

1. Freshly collected *Microcystis aeruginosa* was found to be somewhat toxic for mice and guinea pigs when given parenterally but to be slightly, if at all, toxic when given by mouth.

2. Frozen, or frozen and vacuum dried, *Microcystis aeruginosa* was found to be much more toxic than freshly collected material for mice and guinea pigs.

3. The toxic substance was found to withstand autoclaving but only in neutral solution, to be dialyzable, and to be soluble in alcohol.

4. The toxic substance survives the laboratory equivalent of a water purification process—alum coagulation, chlorination, and filtration. It is adsorbed upon carbon but only when this is used in comparatively large amounts.

5. Three other blue-green algae were nontoxic to mice.

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DEATHS DURING WEEK ENDED OCTOBER 24, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 24, 1942	Corresponding week 1941
Data from 87 large cities of the United States:		
Total deaths	8,881	7,858
Average for 3 prior years	7,921	
Total deaths, first 42 weeks of year	348,982	349,163
Deaths per 1,000 population, first 42 weeks of year, annual rate	11.6	11.6
Deaths under 1 year of age	598	575
Average for 3 prior years	498	
Deaths under 1 year of age, first 42 weeks of year	23,965	21,986
Data from industrial insurance companies:		
Policies in force	65,171,079	64,549,170
Number of death claims	12,457	11,681
Death claims per 1,000 policies in force, annual rate	10.0	9.4
Death claims per 1,000 policies, first 42 weeks of year, annual rate	9.1	9.5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED OCTOBER 31, 1942

Summary

Meningococcus meningitis continues persistently above the 5-year (1937–41) median expectancy. A total of 68 cases was reported for the current week, as compared with 61 for the preceding week and a 5-year median of 35 cases for the week. The highest incidence rates have been reported in the eastern States and in the Pacific area. Low rates obtain in both the North and South Central areas.

The current year will mark a record high incidence of endemic typhus fever. To date, 3,013 cases have been reported, which is a larger number than that recorded for any entire year since cases of this disease have been reported to the Public Health Service. A total of 111 cases was reported during the current week, as compared with 123 for the preceding week and 104 for the next earlier week.

The incidence of poliomyelitis declined from 165 to 140 cases. California, with 21 cases, was the only State reporting more than 12 cases for the current week.

The number of reported cases of influenza increased slightly—from 1,143 to 1,339. Of the current total, the South Atlantic and South Central areas reported 1,100, or 82 percent.

The incidence of most of the other communicable diseases included in the following table remained low. Two cases of anthrax were reported in Pennsylvania, 12 cases of infectious encephalitis in California, and 1 case of leprosy in Texas.

The crude death rate for the current week in 88 large cities in the United States is 12.0 per 1,000 population, as compared with 11.7 for the preceding week and with 11.1 for the 3-year (1939–41) average. The cumulative death rate for this group of cities to date this year is 11.7, as compared with 11.6 for the corresponding period in 1941. This is the first instance in which the current cumulative rate has exceeded that for last year.

Telegraphic morbidity reports from State health officers for the week ended October 31, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Oct. 31, 1942	Nov. 1, 1941		Oct. 31, 1942	Nov. 1, 1941		Oct. 31, 1942	Nov. 1, 1941		Oct. 31, 1942	Nov. 1, 1941	
NEW ENG.												
Maine	0	0	1	------	------	------	1	55	19	2	0	0
New Hampshire	0	1	0	4	------	------	8	0	1	1	0	0
Vermont	0	1	0	------	------	------	63	2	4	0	0	0
Massachusetts	1	2	4	------	------	------	171	145	78	4	1	1
Rhode Island	2	1	1	------	------	------	15	10	3	1	0	0
Connecticut	0	1	0	7	1	1	34	43	8	1	1	0
MID. ATL.												
New York	20	22	22	[1]9	[1]1	[1]8	83	101	101	17	1	2
New Jersey	6	10	9	6	6	5	22	17	17	4	1	1
Pennsylvania	21	9	22	------	1	------	112	112	112	7	2	2
E. NO. CEN.												
Ohio	25	21	34	6	11	18	23	52	25	2	2	2
Indiana	4	22	25	14	16	10	16	3	9	1	3	1
Illinois	17	16	32	5	8	8	16	31	31	2	0	2
Michigan [2]	6	5	7	1	------	1	39	35	44	0	1	2
Wisconsin	0	4	3	22	10	27	43	110	67	0	1	1
W. NO. CEN.												
Minnesota	3	0	2	-	------	2	12	6	9	1	1	1
Iowa	1	8	9	3	1	1	14	21	9	0	0	1
Missouri	6	3	19	2	6	6	1	3	4	0	3	0
North Dakota	0	5	3	------	------	2	1	15	7	0	0	0
South Dakota	1	3	2	------	------	------	1	1	4	0	0	0
Nebraska	2	2	2	5	------	------	29	3	2	0	0	0
Kansas	5	2	4	------	6	6	16	29	10	0	0	0
SO. ATL.												
Delaware	0	4	0	------	------	------	1	1	1	0	0	0
Maryland [2]	4	5	5	1	5	6	8	16	6	1	0	0
Dist. of Col.	0	4	4	1	1	------	0	0	1	1	0	0
Virginia	46	37	43	182	70	60	12	36	20	4	1	1
West Virginia	14	10	28	7	2	6	2	61	7	0	0	1
North Carolina	59	140	140	2		2	1	84	68	2	2	2
South Carolina	30	32	31	201	293	293	4	34	3	0	1	1
Georgia	33	34	42	2	14	14	1	5	2	1	0	1
Florida	33	1	8	8	22	2	2	3	3	1	0	0
E. SO. CEN.												
Kentucky	22	13	22	1	7	5	2	49	35	0	0	2
Tennessee	15	27	29	37	14	14	5	10	5	3	2	2
Alabama	41	23	40	68	28	33	1	51	5	2	1	4
Mississippi [2]	17	20	17	------	------	------	------	------	------	1	0	0
W. SO. CEN.												
Arkansas	20	29	25	23	41	24	9	17	5	1	0	0
Louisiana	5	4	21	2	9	9	0	1	1	0	0	0
Oklahoma	23	11	19	02	50	33	2	5	2	0	0	0
Texas	54	77	39	503	759	194	12	38	10	0	4	1
MOUNTAIN												
Montana	4	0	1	------	2	7	9	19	34	0	0	0
Idaho	0	0	0	2	------	------	26	27	9	0	0	0
Wyoming	0	3	1	26	4	1	3	4	2	1	0	0
Colorado	10	4	9	34	14	7	6	33	24	0	0	0
New Mexico	1	1	1	2	1	1	7	63	19	0	0	0
Arizona	6	0	5	44	85	66	14	75	3	0	0	0
Utah [2]	0	0	0	1	4	4	112	5	7	0	0	0
Nevada	0	0	------	------	------	------	1	0	------	0	0	------
PACIFIC												
Washington	0	1	2	------	------	------	264	3	9	1	2	1
Oregon	6	0	3	13	13	15	83	19	14	1	0	0
California	33	15	15	33	48	13	24	225	55	5	0	1
Total	596	633	840	1,339	1,553	976	1,331	1,678	1,678	68	30	35
43 weeks	11,789	12,359	17,800	89,696	499,509	175,897	474,381	833,621	354,791	2,911	1,704	1,704

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended October 31, 1942, and comparison with corresponding week of 1941 and 5-year median—Continued

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Oct. 31, 1942	Nov. 1, 1941		Oct. 31, 1942	Nov. 1, 1941		Oct. 31, 1942	Nov. 1, 1941		Oct. 31, 1942	Nov. 1, 1941	
NEW ENG.												
Maine	2	0	0	11	12	9	0	0	0	2	1	1
New Hampshire	3	1	0	9	7	3	0	0	0	0	0	0
Vermont	3	1	0	1	3	6	0	0	0	0	0	1
Massachusetts	1	7	3	189	145	80	0	0	0	2	2	2
Rhode Island	0	0	0	6	4	4	0	0	0	1	0	0
Connecticut	0	0	0	19	17	23	0	0	0	0	1	2
MID. ATL.												
New York	6	67	14	200	178	176	0	0	0	8	9	11
New Jersey	11	20	4	60	73	62	0	0	0	1	4	4
Pennsylvania	3	14	8	115	111	177	0	0	0	6	11	15
E. NO. CEN.												
Ohio	4	9	8	184	116	178	0	0	0	14	5	13
Indiana	4	2	4	51	51	101	0	1	1	0	2	2
Illinois	8	20	16	160	148	218	1	0	2	13	2	15
Michigan [2]	4	11	11	53	131	178	0	1	1	4	5	5
Wisconsin	1	5	3	122	111	111	0	0	0	1	1	1
W. NO. CEN.												
Minnesota	3	5	12	53	45	57	0	0	1	0	1	1
Iowa	3	1	3	54	39	66	0	1	1	0	4	2
Missouri	1	2	1	59	52	64	0	1	1	1	3	9
North Dakota	0	1	0	12	12	12	0	1	1	0	1	1
South Dakota	2	0	2	20	6	14	2	0	0	0	0	0
Nebraska	6	0	1	13	8	15	1	0	0	0	4	0
Kansas	11	1	1	60	48	67	0	1	0	3	0	2
SO. ATL.												
Delaware	0	5	0	11	6	7	0	0	0	1	0	0
Maryland [3]	0	6	2	32	39	35	0	0	0	3	5	5
Dist. of Col.	0	2	1	22	12	12	0	0	0	1	0	1
Virginia	1	7	4	77	50	53	0	0	0	9	14	6
West Virginia	0	2	1	48	75	86	0	0	0	0	3	5
North Carolina	2	4	2	128	102	92	0	0	0	3	4	4
South Carolina	2	3	0	10	17	17	0	0	0	4	5	5
Georgia	1	5	1	50	18	33	0	0	0	5	7	8
Florida	2	7	1	7	6	4	0	0	0	3	1	1
E. SO. CEN.												
Kentucky	1	7	5	62	50	73	0	1	0	3	11	11
Tennessee	1	23	1	81	59	59	0	0	0	9	12	6
Alabama	4	22	3	36	58	39	0	0	0	3	3	4
Mississippi [3]	2	0	0	14	12	15	0	0	0	3	0	4
W. SO. CEN.												
Arkansas	2	5	2	5	6	16	0	0	0	6	9	11
Louisiana	1	0	1	5	4	12	0	0	0	3	5	8
Oklahoma	0	1	1	20	21	21	0	0	2	0	1	7
Texas	12	4	3	57	37	48	1	0	1	12	6	14
MOUNTAIN												
Montana	0	1	1	8	25	23	0	0	0	0	0	3
Idaho	0	0	1	4	14	13	0	0	1	0	0	3
Wyoming	0	0	0	1	5	5	0	0	0	0	2	0
Colorado	1	1	2	9	18	23	1	1	3	5	1	3
New Mexico	1	1	0	3	3	7	0	0	0	1	6	6
Arizona	1	0	0	0	0	1	0	0	0	4	0	1
Utah [2]	3	4	3	12	5	10	0	0	0	0	1	0
Nevada	0	0	------	0	0	------	0	0	------	0	0	------
PACIFIC												
Washington	3	1	1	19	44	45	2	0	1	1	1	3
Oregon	3	2	2	9	12	17	0	0	1	0	3	2
California	21	5	9	103	89	106	1	0	1	0	3	5
Total	140	285	247	2,284	2,104	2,511	9	8	25	135	159	268
43 weeks	3,519	8,165	8,165	102,851	102,650	133,540	683	1,215	8,662	6,001	7,505	11,271

See footnotes at end of table

***Telegraphic morbidity reports from State health officers for the week ended October 31, 1942*—Continued**

Division and State	Whooping cough, Week ended— Oct. 31, 1942	Whooping cough, Week ended— Nov. 1, 1941	Week ended Oct. 31, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	46	14	0	0	0	0	0	0	0	0	0
New Hampshire	2	7	0	0	0	0	0	0	0	0	0
Vermont	49	19	0	0	0	0	0	0	0	0	0
Massachusetts	190	168	0	0	1	0	1	0	0	0	0
Rhode Island	4	28	0	0	0	0	0	0	0	0	0
Connecticut	58	84	0	0	0	0	0	0	0	0	0
MID. ATL.											
New York	444	426	0	1	32	0	1	0	0	1	0
New Jersey	169	164	0	1	1	0	0	0	0	0	0
Pennsylvania	238	199	2	0	0	0	0	0	0	0	0
E. NO. CEN.											
Ohio	189	196	0	0	0	0	0	0	0	0	0
Indiana	19	19	0	0	0	0	0	0	0	0	0
Illinois	171	161	0	0	4	0	0	0	0	0	0
Michigan [2]	154	335	0	0	4	0	0	0	0	0	0
Wisconsin	130	308	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	18	66	0	0	0	0	0	0	0	0	0
Iowa	16	20	0	0	0	0	0	0	0	0	0
Missouri	8	11	0	0	0	0	0	0	0	0	0
North Dakota	6	8	0	0	0	0	0	0	0	1	0
South Dakota	0	8	0	0	0	0	0	0	0	0	0
Nebraska	10	6	0	0	0	.	0	0	0	0	0
Kansas	30	40	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	4	3	0	0	0	0	0	0	0	0	0
Maryland [2]	87	31	0	0	0	2	0	0	0	0	0
Dist. of Col	14	24	0	0	0	0	0	0	0	0	0
Virginia	11	61	0	0	0	59	0	0	2	0	1
West Virginia	22	13	0	0	0	0	0	0	0	0	0
North Carolina	42	103	0	0	0	0	0	0	1	0	6
South Carolina	6	77	0	0	6	0	0	0	0	0	4
Georgia	11	20	0	0	1	0	0	0	0	0	36
Florida	3	18	0	5	1	0	1	0	0	0	9
E. SO. CEN.											
Kentucky	32	100	0	0	3	0	0	0	0	0	0
Tennessee	21	45	0	0	0	43	0	0	1	0	1
Alabama	31	5	0	0	0	0	0	0	0	0	14
Mississippi [2]			0	0	0	0	0	0	0	0	1
W. SO. CEN.											
Arkansas	34	17	0	1	0	0	0	0	0	0	2
Louisiana	4	6	0	2	6	0	0	0	0	0	2
Oklahoma	6	1	0	0	0	0	0	0	0	0	0
Texas	69	88	0	16	98	0	0	1	0	1	34
MOUNTAIN											
Montana	18	39	0	0	0	0	0	0	0	0	0
Idaho	3	6	0	0	0	0	0	0	0	0	0
Wyoming	1	8	0	0	0	0	0	0	0	0	0
Colorado	7	38	0	0	0	0	0	0	0	0	0
New Mexico	6	6	0	1	2	0	1	0	0	0	0
Arizona	3	10	0	0	0	28	0	0	0	0	0
Utah [2]	9	20	0	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	13	64	0	0	0	0	0	0	0	0	0
Oregon	2	16	0	0	0	0	0	0	0	0	0
California	187	185	0	8	11	0	12	0	0	0	1
Total	2,597	3,291	2	35	170	132	16	1	4	3	111
43 weeks	149,727	177,485									

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended October 17, 1942

This table lists the reports from 85 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	13	0	1	0	3	0	8	0	0	1
Baltimore, Md	2	0	6	2	0	4	10	0	5	0	0	59
Billings, Mont	0	0	------	0	0	0	0	0	2	0	0	4
Birmingham, Ala	0	0	3	0	0	0	1	0	5	0	0	0
Boise, Idaho	0	0	------	0	0	0	0	0	0	0	0	0
Boston, Mass	0	0	------	0	7	1	10	0	49	0	1	60
Bridgeport, Conn	0	0	------	0	0	0	1	0	1	0	0	1
Brunswick, Ga	0	0	------	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	------	0	10	0	3	0	4	0	0	15
Camden, N. J	1	0	------	0	0	0	1	0	4	0	0	14
Charleston, S. C	0	0	9	0	0	0	0	1	1	0	0	0
Chicago, Ill	12	0	2	3	6	4	29	4	38	0	3	88
Cincinnati, Ohio	7	0	------	0	3	0	0	5	14	0	1	11
Cleveland, Ohio	2	0	1	1	1	0	4	1	25	0	0	28
Columbus, Ohio	0	0	------	0	0	1	2	0	19	0	0	4
Concord, N. H	0	0	------	0	1	0	0	0	0	0	0	0
Cumberland, Md	0	0	------	0	0	0	1	0	1	0	0	0
Dallas, Texas	4	0	-----	0	2	0	2	0	4	0	0	13
Denver, Colo	6	0	12	2	2	0	7	0	8	0	0	0
Detroit, Mich	12	0	------	1	5	1	13	4	10	0	0	88
Duluth, Minn	0	0	------	0	2	0	2	0	2	0	0	6
Fall River, Mass	4	0	------	0	0	1	1	0	6	0	0	1
Flint, Mich	0	0	------	0	0	0	2	0	3	0	0	19
Fort Wayne, Ind	0	0	-----	0	0	0	1	0	0	0	2	1
Frederick, Md	0	0	------	0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	------	0	0	0	2	0	1	0	0	0
Grand Rapids, Mich	0	0	-----	1	2	0	3	0	0	0	0	3
Great Falls, Mont	0	0	------	0	0	0	0	0	1	0	0	0
Hartford, Conn	1	0	-----	0	1	1	0	1	0	0	0	9
Helena, Mont	0	0	------	0	0	0	0	0	0	0	0	0
Houston, Tex	8	0	------	0	0	0	3	0	2	0	0	4
Indianapolis, Ind	0	0	------	0	2	0	8	1	6	0	0	20
Kansas City, Mo	1	0	1	1	1	0	2	0	10	0	0	2
Kenosha, Wis	0	0	------	0	1	0	0	0	5	0	0	6
Little Rock, Ark	0	0	-----	0	0	0	4	0	2	0	0	0
Los Angeles, Calif	6	0	8	1	4	0	9	4	8	0	1	11
Lynchburg, Va	0	0	------	0	1	0	0	0	1	0	0	0
Memphis, Tenn	0	0	------	0	1	0	9	1	3	0	0	17
Milwaukee, Wis	0	0	1	1	14	0	2	0	19	0	0	22
Minneapolis, Minn	3	0	------	0	1	0	1	1	9	0	0	5
Missoula, Mont	0	0	------	0	0	0	0	0	0	0	0	0
Mobile, Ala	1	0	10	1	0	0	1	0	1	0	0	0
Nashville, Tenn	0	0	-----	0	0	0	1	0	4	0	0	0
Newark, N. J	0	0	4	0	5	2	0	0	1	0	0	19
New Haven, Conn	0	0	1	0	0	0	1	0	7	0	0	12
New Orleans, La	1	0	1	1	0	0	6	1	3	0	1	0
New York, N. Y	17	0	6	0	14	3	43	7	62	0	4	131
Omaha, Nebr	0	0	-----	0	1	0	1	0	4	0	0	0
Philadelphia, Pa	1	0	------	0	47	4	18	1	25	0	0	102
Pittsburgh, Pa	0	0	------	0	1	0	12	0	3	0	1	7
Portland, Me	0	0	------	0	2	1	1	2	1	0	0	4
Providence, R. I	0	0	------	0	0	2	2	0	0	0	1	17
Pueblo, Colo	0	0	------	0	0	0	1	0	3	0	0	0
Racine, Wis	0	0	------	0	2	0	0	0	7	0	0	1
Raleigh, N. C	0	0	------	0	0	0	0	0	0	0	0	0
Reading, Pa	0	0	------	0	0	1	0	0	0	0	0	6
Richmond, Va	0	0	1	1	0	0	3	0	3	0	0	0

City reports for week ended October 17, 1942

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va	0	0	------	0	0	0	0	0	1	0	0	0
Rochester, N. Y	0	0	------	0	1	0	4	0	3	0	0	10
Sacramento, Calif	2	0	------	0	2	1	3	0	6	0	1	1
Saint Joseph, Mo	0	0	------	0	1	0	2	0	1	0	0	0
Saint Louis, Mo	1	0	------	0	1	0	9	2	9	0	0	8
Saint Paul, Minn	0	0	------	0	1	0	4	0	3	0	0	24
Salt Lake City, Utah	0	0	------	0	17	0	3	1	4	0	0	4
San Antonio, Tex	2	0	------	0	0	0	3	3	1	0	0	1
San Francisco, Calif	1	0	1	0	6	0	8	0	8	0	0	14
Savannah, Ga	0	0	------	0	0	0	0	0	0	0	0	5
Seattle, Wash	0	0	------	0	1	0	5	0	1	0	0	8
Shreveport, La	0	0	------	0	0	0	5	0	3	0	0	0
South Bend, Ind	0	0	------	0	0	0	0	0	0	0	0	0
Spokane, Wash	1	0	------	0	2	1	3	1	1	0	1	0
Springfield, Ill	0	0	------	0	1	0	0	0	0	0	0	3
Springfield, Mass	0	0	1	0	4	0	2	0	29	0	0	2
Superior, Wis	0	0	------	0	0	0	0	0	1	0	0	5
Syracuse, N. Y	0	0	------	0	1	0	1	3	6	0	0	15
Tacoma, Wash	0	0	------	1	20	0	0	0	3	0	0	0
Tampa, Fla	0	0	------	0	0	0	2	0	0	0	1	0
Topeka, Kans	0	0	------	0	0	0	2	0	2	0	0	0
Trenton, N. J	0	0	---	0	0	0	1	0	1	0	0	9
Washington, D. C	3	0	2	1	0	2	10	0	15	0	2	0
Wheeling, W. Va	0	0	------	0	0	0	0	0	0	0	[illegible]	0
Wichita, Kans	0	0	------	0	0	0	4	0	9	0	1	4
Wilmington, Del	0	0	------	1	0	1	6	1	1	0	1	0
Winston-Salem, N. C	2	0	------	0	2	0	2	0	5	0	0	5
Worcester, Mass	0	0	------	0	1	0	5	0	8	0	0	11

Dysentery, amebic—Cases: New York, 3; Rochester, 1; St. Louis, 1.

Dysentery, bacillary—Cases. Baltimore, 7; Charleston, S. C., 14; Chicago, 2; Detroit, 3; Los Angeles, 2; New York, 9; Philadelphia, 1; Richmond, 1; San Francisco, 1.

Dysentery, unspecified—Cases. San Antonio, 2.

Typhus fever—Cases: Atlanta, 1; Houston, 1; Nashville, 4; New Orleans, 2; Shreveport, 1; Tampa, 1; Winston-Salem, 1; delayed report, week ended Oct. 3, Washington, D. C, 1.

Rates (annual basis) per 100,000 population for the group of 85 cities included in the preceding table (estimated population, 1942, 33,923,846)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Week ended Oct. 17, 1942	15.52	12.76	2.92	30.89	47.65	80 08	0.00	3.38	144.33
Average for week 1937–41	15.84	9.63	2.64	[1] 40.85	[2] 51.42	77.36	0.31	6.37	153.32

[1] Median.
[2] 3-year (1939–41) average, 45.9.

PLAGUE INFECTION IN CALIFORNIA

Under date of October 16, 1942, plague infection was reported proved in pools of ectoparasites from rodents and from a jack rabbit collected in California as follows:

Kern County.—July 29, 2 ticks from 1 jack rabbit, *Lepus californicus*, taken 10 miles west of Wheeler Ridge; July 30, 53 fleas from

4 ground squirrels, *C. beecheyi*, taken 7 miles south and 5 miles west of Tehachapi; 32 lice and 200 fleas from 31 ground squirrels, *C. beecheyi*, taken 12 miles east of Wheeler Ridge.

Mono County.—September 4, 49 fleas from 21 ground squirrels, *C. beldingi*, taken 1 mile south and 1 mile west of Mammoth Post Office, 29 fleas from 27 chipmunks, *Eustamias* sp., and 52 fleas from 36 golden mantled ground squirrels, *C. lateralis* sp., taken 1 mile south and 2 miles west of Mammoth Post Office; September 8, 9, and 21, respectively, 99 fleas from 49 golden mantled ground squirrels, 24 fleas from 22 chipmunks, and 15 fleas from 16 golden mantled ground squirrels, all taken one-half mile east of Mammoth Post Office.

Siskiyou County.—September 15, 144 fleas from 11 ground squirrels, *C. douglasii*, taken 4½ miles north of Gazelle.

TERRITORIES AND POSSESSIONS

Virgin Islands of the United States

Notifiable diseases—July–September 1942.—During the months of July, August, and September 1942, cases of certain notifiable diseases were reported in the Virgin Islands as follows:

Disease	July	August	September	Disease	July	August	September
Chickenpox	2		1	Mumps	6		2
Filariasis	8	11	4	Schistosomiasis			2
German measles	1			Syphilis	34	22	18
Gonorrhea	11	16	8	Trachoma			1
Hookworm disease	2	3	3	Tuberculosis	5	4	
Malaria		1		Typhus fever			1
Meningococcus meningitis		1		Whooping cough		3	2

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended October 3, 1942.—During the week ended October 3, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		3			2		1	1	2	9
Chickenpox		1	1	93	64	21	27	15	26	248
Diphtheria	3	13	3	23	2	4	1	5	2	56
Dysentery				29			1			30
Encephalomyelitis							1			1
German measles		1		3	6		1			11
Influenza		2			3				5	10
Lethargic encephalitis						1			1	2
Measles				76	12	6	19	2	11	126
Mumps		14	2	63	88	8	17	20	97	309
Pneumonia					4	2			[illegible]	12
Poliomyelitis		6	2	9	1				2	20
Scarlet fever		6	6	83	45	6	17	30	22	215
Trachoma									2	2
Tuberculosis	1	3	13	128	51	13	11		13	233
Typhoid and paratyphoid fever			2	18	2	1		1		24
Undulant fever					2	1			2	5
Whooping cough		12	3	300	66	27	5	14	39	466
Other communicable diseases		4			312	21	1	7		345

EGYPT

Infectious diseases—First quarter 1942.—During the first quarter of 1942, certain infectious diseases were reported in Egypt as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	4		Pneumonia	1,801	1,499
Cerebrospinal meningitis	98	38	Poliomyelitis	2	1
Chickenpox	433	3	Puerperal septicemia	91	49
Diphtheria	469	239	Rabies	12	11
Dysentery	602	109	Scarlet fever	16	
Erysipelas	877	89	Tetanus	105	81
Influenza	3,087	84	Tuberculosis	1,679	1,047
Leprosy	171	17	Typhoid fever	706	160
Lethargic encephalitis	2	2	Typhus fever	7,720	1,225
Malaria	467	14	Undulant fever	2	
Measles	2,318	660	Whooping cough	890	47
Mumps	617	2			

Vital statistics—First quarter 1942.—Following are the numbers of births and deaths for the first quarter of 1942 for all localities of Egypt having a health bureau:

Number of live births	65,974
Births per 1,000 population	47.6
Deaths, all causes	38,741
Deaths per 1,000 population	27.9
Deaths under 2 years of age	7,521
Deaths under 2 years of age per 1,000 live births	114

JAMAICA

Communicable diseases—4 weeks ended August 29, 1942.—During the 4 weeks ended August 29, 1942, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	1	8	Tuberculosis	36	63
Diphtheria	7	3	Typhoid fever	12	30
Dysentery	5	8	Typhus fever	8	3
Leprosy	1	4			

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Morocco.—Plague has been reported in Morocco as follows: Week ended October 3, 1942, 2 cases; week ended October 10, 1942, 3 cases.

Typhus Fever

Algeria.—Typhus fever has been reported in Algeria as follows: September 11–20, 1942, 89 cases; September 21–30, 1942, 101 cases.

Hungary.—For the week ended October 10, 1942, 8 cases of typhus fever were reported in Hungary.

Morocco.—For the week ended October 3, 1942, 25 cases of typhus fever were reported in Morocco, and for the week ended October 10, 1942, 30 cases were reported.

Rumania.—For the week ended October 17, 1942, 35 cases of typhus fever were reported in Rumania.

Tunisia.—Correction.—For the period September 1–10, 1942, according to a later report received, only 133 cases of typhus fever were reported in Tunisia, instead of 1,333 cases as previously reported.

Turkey.—For the week ended October 17, 1942, 4 cases of typhus fever were reported in Turkey.

COURT DECISION ON PUBLIC HEALTH

Milk ordinance inspection fees upheld.—(Kentucky Court of Appeals; *City of Newport et al.* v. *Hiland Dairy Company et al.*; decided June 16, 1942.) A city milk control ordinance provided, among other things, for the payment of a monthly inspection fee by the owner or operator of a milk plant whose milk and milk products were sold in the city. Such fee was based upon the weight of all milk and milk products received or produced at the milk plant and entitled the owner or operator of such plant to regular inspections, which included systematic and regular inspections of the premises and equipment of all milk producers who supplied milk or milk products to such plant for determination of grade. The fee paid to the city was deemed to be consistent with the actual value of the services rendered by the city.

In considering certain questions involving the above-mentioned provisions the Court of Appeals of Kentucky said that the purpose back of the ordinance was the sale of pure milk in the city and that the ordinance was directed primarily at those who sought to distribute milk. The distributors, according to the court, were the ones benefited mainly by the ordinance because, if they were unwilling to obtain a license and to sell the character of milk called for, they would be denied the privilege of doing business in the city. This disposed of the question of the city's right to impose an inspection fee upon the distributors which would be adequate to inspect their plants, as well as the plants of the producers from whom they purchased milk.

Relative to the basing of the fee upon the volume of milk coming into the distributor's plant rather than upon the volume of milk sold in the city, the conclusion was reached that this was not an unreasonable or arbitrary act on the city's part. It was said that at first blush this might seem unfair but the necessity for inspecting all the milk handled by a distributor was apparent when it was considered that the milk, whether gathered in the distributor's own vehicles or purchased at his doors from producers, was so mixed and commingled that it was impossible to trace the product of any one producer. Should impure milk from only one herd reach a distributor's plant it could contaminate his whole supply. Furthermore, the inspector's duties would be the same regardless of the amount of milk a distributor might sell within the city. For example, said the court, if a distributor gathered milk from 20 farms but sold only 10 percent of it in the city, it would still be the inspector's duty to inspect all of the 20 producing plants, as well as the distributor's plant. "Unless proper facilities were established, there would be no way of segregating milk going to consumers in the city."

The next question considered was whether the levying of the inspection fees was unreasonable and arbitrary as between distributors, the example being cited of a small distributor paying a very small fee while a large distributor would be required to pay a much larger fee even though the major part of his milk might be sold outside the city. The levy, said the court, was upon a class and involved the volume of business done or, at least, the possibilities for business. "Such a plan seems reasonable to us. Because of the unusual character of the commodity under consideration and the possibility of a very small amount of impure milk contaminating a large amount of it, we fail to see how one can seriously contend that the levying of the fee on the basis of the volume of milk coming into the plant is arbitrary." It was pointed out that the large distributor who sold the major portion of his milk outside the city could, if he so desired, arrange his facilities for handling separately that part of his milk sold in the city.

With respect to the remaining question as to whether the fees would produce an amount in excess of that necessary to carry out the purposes of the ordinance, it was stated that this condition, if it should arise, could be readily adjusted, since the ordinance clearly set forth that it was the city's intent to collect only an amount sufficient to effectuate the ordinance.

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THE ISOLATION OF *HAPLOSPORANGIUM PARVUM* N. SP. AND *COCCIDIOIDES IMMITIS* FROM WILD RODENTS. THEIR RELATIONSHIP TO COCCIDIOIDOMYCOSIS [1, 2]

By C. W. EMMONS, *Senior Mycologist*, and L. L. ASHBURN, *Passed Assistant Surgeon, United States Public Health Service*

The investigations of Dickson (*6, 7, 8, 9*), Gifford (*9, 12*), Smith (*5, 15, 16, 17*), and many others, by correcting and clarifying earlier concepts, have made coccidioidomycosis well known as a mycotic disease of man, occurring frequently within endemic areas and probably only by importation elsewhere. Giltner (*13*), Beck (*3, 4*), and Stiles and his associates (*19, 20*) have reported the occurrence of the disease (in most cases in a localized and arrested form) in cattle and sheep, and Farness (*11*) has reported cases in the dog. It is reported (*19*) that Dr. E. W. Phillips observed a disease in sheep in the vicinity of Phoenix, Ariz., which resembled coccidioidomycosis, and from which he isolated a "fungus-like organism" tentatively identified as a variant of *C. immitis*. The paper by Stiles and Davis (*19*) contains a summary and bibliography of the reported cases in animals.[3]

It is generally believed that both man and animals become infected by inhalation of spore-laden dust. Direct transmission of the disease from one individual to another does not commonly occur. There must, therefore, be some reservoir, such as the soil in which the fungus, *Coccidioides immitis*, may grow saprophytically, or a living host, either plant or animal, which provides for the propagation and dissemination of the etiological fungus.

In a preliminary paper (*10*) the occurrence of coccidioidomycosis in wild rodents was reported for the first time. In a second paper (*2*) the histology of the granulomatous lesions found in these animals was described. The chronic nature of the lesions suggested that rodents may constitute a natural reservoir of coccidioidomycosis which

[1] From the Divisions of Infectious Diseases and Pathology, National Institute of Health.

[2] This investigation was aided by the Office of Indian Affairs, Department of the Interior, as part of a cooperative study. The authors are particularly indebted to Dr. J. D. Aronson and Dr. R. D. Cunningham for aid in furnishing facilities for field studies.

[3] A report of coccidioidomycosis in a dog in Canada appears in the Canadian Journal of Comparative Medicine for May 1941. No culture was isolated and the diagnosis was made from sections. An examination of stained sections kindly sent by Dr. P. J. G. Plummer revealed very numerous budding cells entirely typical of *Blastomyces dermatitidis*—convincing evidence that this was actually a case of American blastomycosis.

influences the distribution and epidemiology of the disease in man. Because of certain confusing aspects of the disease in rodents, a complete analysis of the data was not made in the preliminary reports. Two additional series of rodents have now been collected in the same area but during other seasons of the year. An adequate explanation of all observed phenomena cannot yet be offered, but a more complete report can now be made.

The study was made on the San Carlos Indian Reservation, San Carlos, Ariz., which lies outside the previously recognized endemic areas of the disease. This area was chosen because the studies of Aronson et al. (*1*) had furnished evidence that coccidioidomycosis is prevalent there, although not recognized clinically. This evidence was based on the demonstration that 92 percent of Indian school children tested reacted to the intradermal injection of coccidioidin. If a reaction to coccidioidin is accepted as evidence of a previous infection, his studies indicated further that in this area coccidioidomycosis is predominately a disease of early childhood. The mildness of the disease in young children and the fact that comparatively few persons first enter the area as adults may account in part for the peculiar circumstances of a population in which most individuals have probably at some time been infected, but in which no clinically apparent case of the disease has yet been recognized and proved. Cases of the disease were not available for study, and in order to obtain an explanation of the evidence supplied by skin-testing with coccidioidin, the etiological agent itself was sought in other hosts and in soil.

The difficulty of isolating *C. immitis* from soil is generally recognized, but Stewart and Meyer (*18*) and Davis et al. (*5*) have reported its isolation from this substrate at two sites in the San Joaquin Valley of California. Using the methods described by Stewart and Meyer, a search for Coccidioides was begun in the vicinity of San Carlos in July 1941 (*10*). By inoculating guinea pigs with suspensions of soil, *C. immitis* was isolated from 5 of about 150 samples taken in three widely separated sites and representing three different types of soil. The diverse characters of these soils, the relative infrequency with which the fungus has been isolated from soil in the San Joaquin Valley as well as at San Carlos, and a consideration of the virulence of the fungus for animals suggested that it may be primarily a pathogen of animals and that its spores are perhaps to be found in soil only after it has been contaminated by infected animals. The small rodents were first investigated because they are very numerous on the desert, and some species were known to be susceptible to experimental infection. During December 1941, and March, April, and July, 1942, 303 wild rodents were trapped and examined (table 1). They were obtained from five sites in an area surrounding San Carlos Hospital,

within a maximum radius of about 7 miles. These sites[4] were chosen because of the evident presence of rodents in considerable numbers, and, in the case of sites Nos. 1, 3, and 4, because the fungus sought had already been isolated from soil at these places. The five sites had in common the presence of certain species of rodents. Animals infected by fungi were obtained from all sites, and, so far as numbers were sufficient for analysis, the percentage of infected animals of a given susceptible species was about the same in all.

TABLE 1.—*Animals with fungus infections as determined by observation of lesions or isolation of cultures, tabulated according to species and time of collection*

	December series		March series		July series		Total		
	Trapped	Infected	Trapped	Infected	Trapped	Infected	Trapped	Infected	Percent infected
Perognathus baileyi (pocket mouse)	12	9	10	10	6	6	28	25	89
Perognathus penicillatus, P. intermedius (pocket mice)	12	11	73	57	11	10	96	78	81
Dipodomys merriami (kangaroo rat)	7	3	19	9	3	0	29	12	41
Citellus harrisi (squirrel)	1	1	8	7	1	0	10	8	80
Onychomys torridus (grasshopper mouse)	10	0	10	2	7	1	27	3	11
Peromyscus eremicus (deer mouse)	59	2	48	0	6	0	113	2	1.7
All species	101	26	168	85	34	17	303	128	42

It was not surprising to find that soil-dwelling rodents, living in areas where coccidioidomycosis is endemic, were in some cases infected. They live in soil from which *C. immitis* has been isolated and in an area where spores of the fungus must be often present according to evidence supplied by skin-testing of human residents. If, as has been generally supposed, the fungus grows in soil, one would expect few susceptible animals living in burrows in infested soil to escape infection after such intimate exposure. However, a surprising and wholly unexpected fact which casts some doubt on this simple explanation immediately became apparent. Deer mice (*Peromyscus eremicus*) are susceptible to a quickly fatal disease which follows intraperitoneal injection of spores in the laboratory, but none of 113 animals of this species caught in the field were infected with *C. immitis* and this fungus was isolated from only 1 of 27 grasshopper mice (*Onychomys torridus*). On the other hand, 15 percent of 124 pocket mice (*Perognathus baileyi, P. penicillatus*, and *P. intermedius*) and 17 percent of 29 kangaroo rats (*Dipodomys merriami*) trapped were infected by *C. immitis* (table 2). It is obvious from field data that the course of

[4] The sites were: (1) points on both sides of the Ash Creek Ranch road between 4 and 5 miles from the San Carlos Hospital; (2) in Seven Mile Wash, 2 to 4 miles from the hospital; (3) beside the road toward the tufa quarries, 1 to 3 miles from the hospital; (4) beside the Globe Road, 1.5 to 3 miles from the hospital; and (5) to the left of the road toward Coolidge Dam, about 7 miles from the hospital.

the granulomatous process produced in these rodents is not rapid enough to exterminate the species. Indeed, it may be that it does not materially reduce the population. Information on the latter point is not available except that many of the infected animals caught in March and April were pregnant or lactating females. Based on the above evidence of the relationship of pocket mice and kangaroo rats to this disease, it seems that these rodents may serve as an animal reservoir of coccidioidomycosis. The relationship of other species to this disease is more obscure. It is suspected that there is a seasonal variation in the distribution of the disease in rodents which has not yet been observed. It would not be surprising to find coccidioidomycosis occurring in epidemic fatal form among deer mice, for example, at another season of the year.

TABLE 2.—*Species of fungus isolated from rodents with and without observed lesions*

	Total trapped	Lesions	Only *C. immitis* isolated	Only *H. parvum* isolated	*C. immitis* and *H. parvum* isolated	Total animals
Perognathus	124	Seen	11	18	5	34
		Not seen	1	60	2	63
Dipodomys	29	Seen	3	1	2	6
		Not seen		5		5
Citellus	10	Seen		5		5
		Not seen				
Onychomys	27	Seen	1			1
		Not seen		1		1
Peromyscus	113	Seen				
		Not seen		2		2
Total	303		16	92	9	*117

*Cultures from 11 additional animals were contaminated and the pathogens, if present, were lost.

Of the 303 wild rodents trapped, 128, or 42 percent, had fungus infections (table 1). This number represents a selection. It was found early in the study that a mycosis was frequently present in certain species of rodents, and in subsequent studies attempts were made to trap as many as possible of these species. Lesions were observed in 55 animals and fungi were isolated from 46 of these. Fungi were also isolated from 71 in which no lesions were found (tables 1 and 2). The fungus isolated was *C. immitis* in 25 cases and an apparently related new fungus described below in 101 cases (table 2). These numbers include 9 cases in which both fungi were isolated from the same animal. The strains of *C. immitis* isolated were typical of the species in morphology and virulence for laboratory animals and need not be considered further at this time. The second fungus requires a description, a recital of the circumstances surrounding its isolation, and a discussion of its probable relationship to the disease in rodents and to *C. immitis*. This fungus has the generic characters

of *Haplosporangium* [5] Thaxter, and the name *Haplosporangium parvum* is proposed, the specific name being descriptive of the small size of the fungus in comparison with other species of the genus. To comply with the International Rules of Botanical Nomenclature, a short Latin diagnosis, prepared with the assistance of Mrs. Hope F. Norris, is given in addition to the more detailed English description.

Haplosporangium parvum sp. nov.: Mycelio tenue, albido, demum fulvello; conidiophoris gracilibus, indivisis vel ramosis, 0.5 x 1-10μ; conidiis globosis, rugosis vel levibus, 3–3.5μ diam.

Mycelium delicate, matted, white, becoming slightly brownish with age, aerial hyphae tufted in some strains which produce unusually large numbers of spores, sparse in other strains; hyphae averaging about 1μ, but rarely reaching 4μ in diameter, with few septa and these not necessarily related spatially to branches; conidiophores slender, simple and only 0.5–4μ long, or branched and 0.5 x 1-10μ, in most cases not tapering toward the apex; conidia spherical or subspherical, minutely spiny, becoming smooth, 3–3.5μ in diameter, containing one or more hyaline bodies.

Present as spherical nonbudding cells reaching a diameter of 14μ in lung tissue of Perognathus, Dipodomys, Citellus, and other rodents trapped in the vicinity of San Carlos, Ariz.

Haplosporangium parvum grows more slowly than *C. immitis*. On acid dextrose agar the colony appears first as a glabrous colorless disc, the hyphae forming a rather firm surface mat with an even border. As growth proceeds, a small tuft of white aerial hyphae appears at the center of the colony, and delicate aerial hyphae gradually appear over the rest of the colony (figs. 2a, c, e). The strains isolated vary considerably in colony characteristics (figs. 2a–f). Some always retain glabrous zones. Most become entirely covered with densely matted but delicate white aerial hyphae, becoming brownish with age, which may form a cottony layer as much as 6 or 8 mm. deep. On agar slants this extends up onto the sides of the culture tube. In some strains the colony surface becomes tufted with a suggestion of chalkiness (fig. 2b) and is cream colored even while still young, a condition usually associated with increased spore production. Such strains approach *C. immitis* in appearance, but the hyphae are always more delicate, and the microscopic morphology is different.

Microscopic.—The hyphae are delicate, most falling within the limits of 0.5–2μ and averaging about 1μ in diameter. Occasional hyphae reach a diameter of 4μ. Branching is frequent and the location seems to be independent of the location of cross walls. Septa are infrequent or difficult to demonstrate except in old hyphae, where the

[5] The authors are indebted to Dr. David H. Linder, curator of the Farlow Herbarium, Harvard University, for an opportunity to examine type material of Haplosporangium, and to discuss the fungus with him.

protoplasm is sometimes divided by pseudosepta and vacuoles in a manner suggesting the Phycomycetes. The spores are borne singly, or rarely in chains of two at the ends of hyphae or at the tips of short lateral conidiophores (figs. 3a–d and fig. 1).

Conidiophores are simple (0.5 x 1-10μ) or complex. The latter vary from short branches bearing two or more spores to longer branches bearing many lateral spores. A type of conidiophore frequently seen is shown in figure 1a. A swollen hyphal tip which would appear to have the potentialities of a spore proliferates by the formation of two or more branches which are terminated by conidia. Conidia are almost spherical except for a short tubular projection or stalk at the base. Many young spores are slightly flattened, the point of attach-

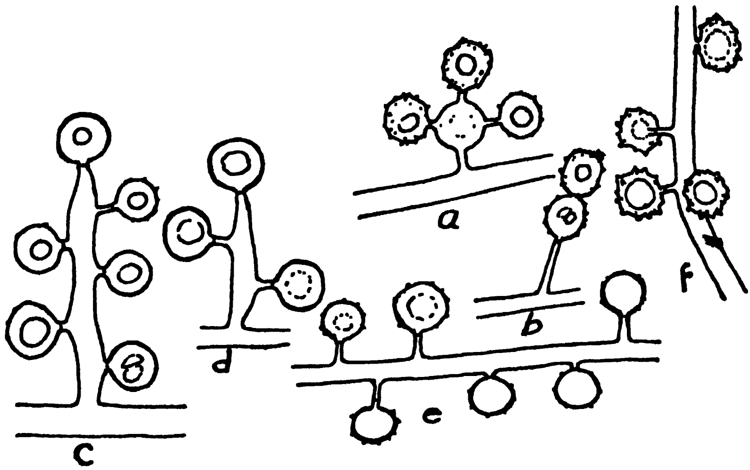

FIGURE 1.—Microscopic structure and production of conidia in *Haplosporangium parvum*.

ment to the conidiophore being on one flattened side. Spores average 3–3.5μ in diameter. Exceptional spores are clavate and much larger.

Spore formation is initiated by the development of a smooth spherical swelling at the tip of the conidiophore. As this swollen structure increases in size, rough markings, which under high magnification resemble spines, develop on the outer surface. In mature spores these markings are less conspicuous, and many old spores are quite smooth (fig. 1c). Formation of the spore is completed by the development of a wall across the conidiophore 0.25–0.5μ below the tip of the latter. The location of this wall well below the spherical portion of the spore produces the stipitate character of the spore already mentioned.

The manner of spore development in culture may be interpreted as an endogenous process within a sporangium. Shrinkage of the immature sporangium when placed in mounting fluid for examination

probably emphasizes the external markings. As the spore matures it increases in size, completely filling the space, and the sporangial wall disappears, or, more probably, adheres closely to the spore wall, the external markings being lost or partially obliterated. The structure can be defined as a monosporial sporangium or sporangiole, or more properly, a conidium. If this interpretation is correct, the fungus may be placed beside the three species of *Haplosporangium* Thaxter already described. Its spores also resemble the "stylospores" of Mortierella, furnishing additional evidence for a relationship to the Phycomycetes. It differs from the other species of Haplosporangium in size and shape of the conidiophore. *H. bisporale* Thaxter and *H. decipiens* Thaxter (*21*), isolated from dung, and *H. lignicola* Martin (*14*), isolated from rotten wood, are much larger and have tapering conidiophores.

Pathology.—The previous report (*2*) on the pathology of spontaneous coccidioidal granuloma was based on the lesions found in 9 of the first series of rodents trapped. Since then 121 animals from the second series have been examined histologically and of these nodular lesions were present in 20 pocket mice, 5 kangaroo rats, and 7 ground squirrels. In addition, the series included 7 animals with lesions which were not studied histologically.

From the first series the impression was gained that the lesions occurred more often in specific areas of the lungs. This impression, however, was not supported by the second and larger series of animals. In 25 mice and rats there were numerous lesions in the lungs of 8 (fig. 5g), many in 4, a few in 6, and from 1 to 3 lesions in the remaining 7 animals. When multiple nodules were present, they were diffusely distributed in all lobes. However, they were more often located peripherally than in the deeper part of the lung parenchyma.

Since the histology of the granulomas has been previously reported in detail (*2*), only their basic structure will be described here. In the mice and rats the lesions are formed of fusiform epithelioid cells irregularly disposed in central areas, but often showing concentric arrangement peripherally. In some nodules very large polygonal mononuclear cells form part or all of the central zones. This is particularly evident in the granulomas from the kangaroo rats. The nodules are well circumscribed and often have a peripheral zone of compactly disposed lymphocytes. Caseous or infrequently karyorrhectic necrosis was present in approximately 90 percent of the nodules examined. Fibrosis was noted in only two of the 20 lesions present in the first series, whereas in the second series 37 of 55 lesions showed slight to moderate fibrosis, or less often tufts or bands of sparsely cellular dense scar tissue. Calcification of the caseous material was observed in three lesions from the second series and

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once in the first. In one of these nodules many of the fungus cells were also calcified.

Six early lesions were found in the lungs of two animals. These nodules were poorly circumscribed and formed of plump and short epithelioid cells growing within alveoli. They also showed many scattered neutrophils and a few minute to small foci of suppuration. In one of these lesions very large numbers of recently liberated endospores were seen. Groups of two or three were not infrequently present within phagocytes. One such early lesion was present in the first series.

The lesions of the seven ground squirrels were similar in all respects to the one described in the previous report. They were formed of large aggregations of mononuclear cells with ample cytoplasm and fewer irregularly scattered lymphocytes. In such lesions fungi were generally present in small numbers although in two, large clusters were present within giant cells, and in one a sporangium filled with faintly stained endospores was seen.

The fungus cells within granulomas showed considerable variation in number, size, depth of staining, and amount of cytoplasm. In some nodules fungi were present in very small numbers, whereas in a few 100 or more were counted in single 7μ sections.

As in the previous series endosporulating forms of the fungi were rarely observed, although it is obvious that the fungus present in at least some of the granulomas was *C. immitis*, since this fungus was isolated in culture from some of them. A belief that this suppression of maturation and endosporulation is a result of host influence is supported by the fact that when strains of *C. immitis* from these animals were inoculated into experimental animals endosporulating forms were regularly observed in the resultant lesions.

In the report describing the histology of the lesions, brief reference was made to the presence of fungus cells scattered in the lung parenchyma unrelated to granulomas as well as in lungs without granulomas. They have been found with equal regularity in animals of the second series. Although similar in some respects, most of these fungi show striking differences from those present in the nodules. These extragranulomatous fungi are generally spherical and have distinct, doubly contoured walls. Most of them have dense homogeneous deeply basophilic cytoplasm. In sections stained the proper depth for tissue nuclei, the cytoplasm of some of these fungi appears so dense that very little light is transmitted through them (figs. 5b and f). Many of these fungi show medium sized (one-third to one-half the diameter of the cell), central, less often multiple, small, fairly sharply marginated vacuoles. Even when such vacuoles are present, the surrounding or intervening cytoplasm is dense and homogeneous. It is believed that these deeply stained cells are those of *Haplosporangium*

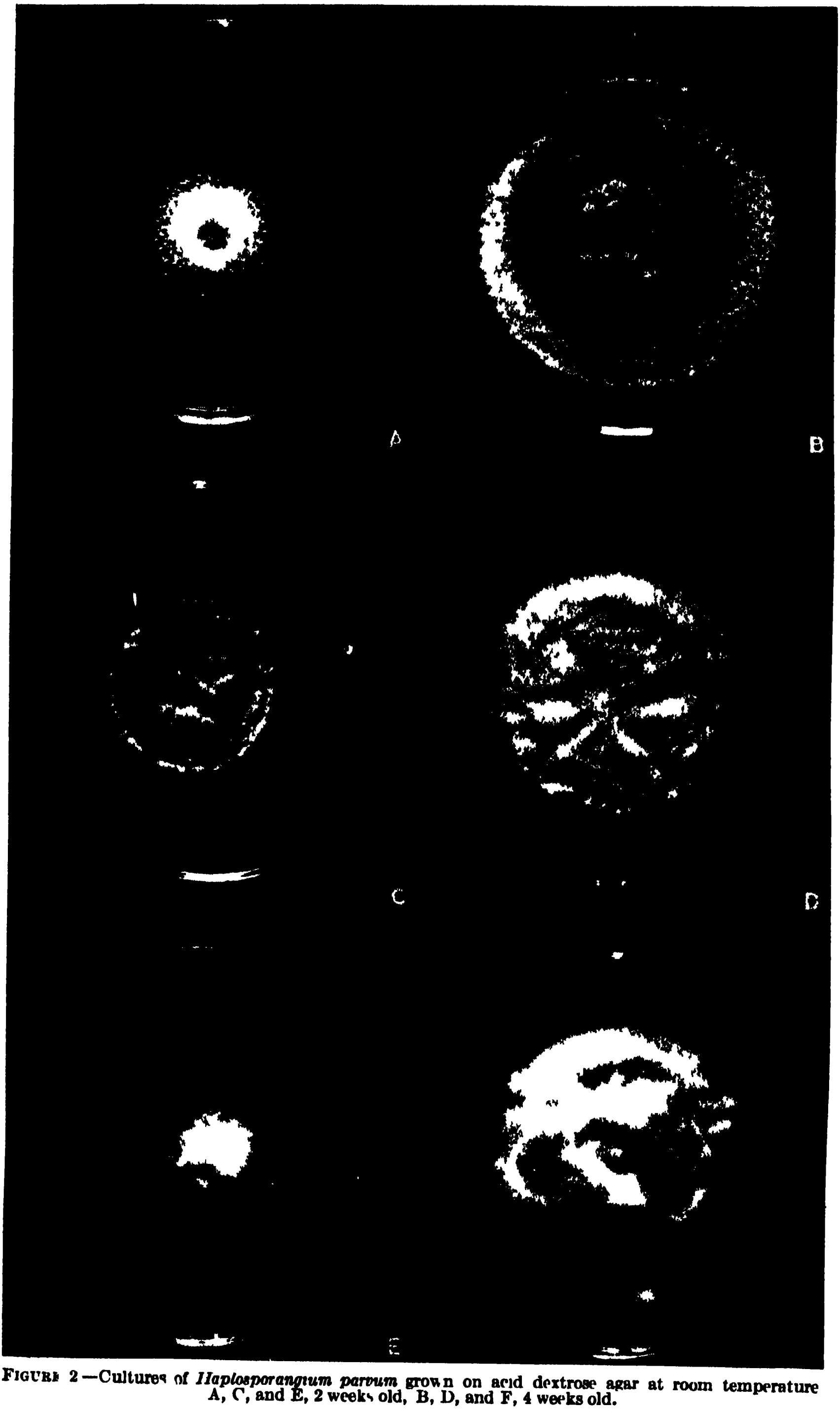

FIGURE 2 — Cultures of *Haplosporangium parvum* grown on acid dextrose agar at room temperature A, C, and E, 2 weeks old, B, D, and F, 4 weeks old.

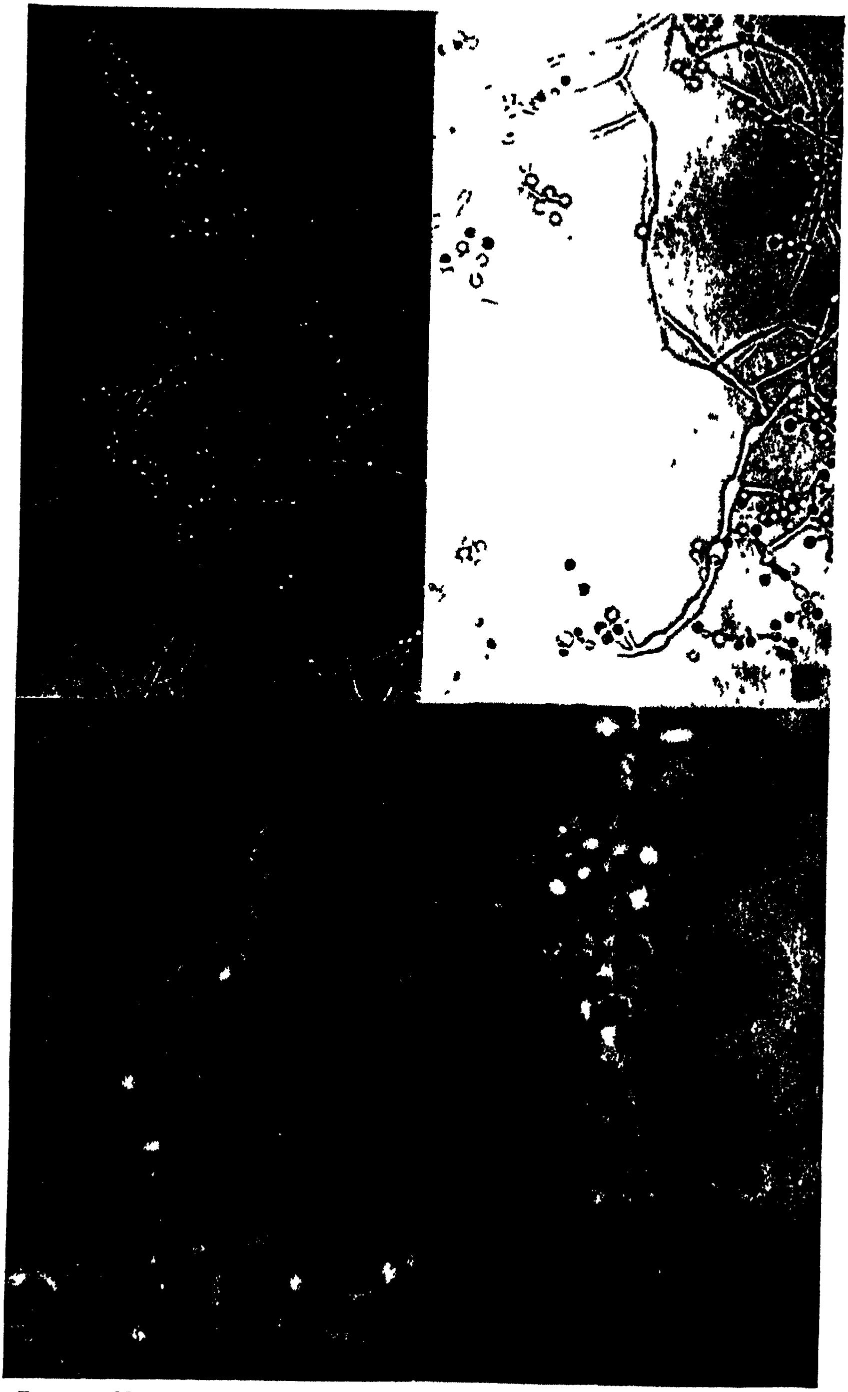

FIGURE 3 —Microscopic appearance of *H parvum* in culture. A and B, ×350. C and D, ×1120.

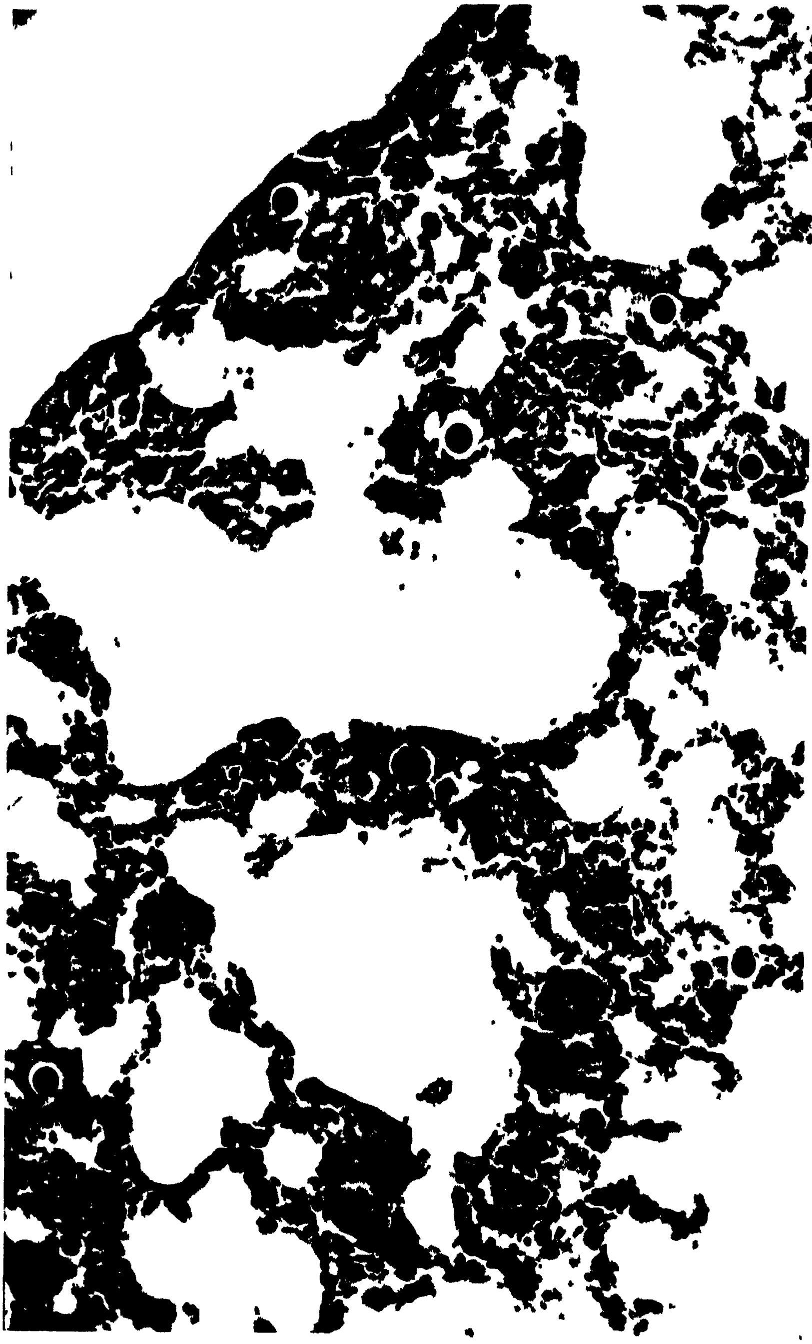

FIGURE 4.—Photomicrograph of mouse lung showing many fungus cells. Most are of the dense, intensely stained variety (*H. parvum*). Some are enclosed in groups of large mononuclear cells. Romanowsky stain, ×300.

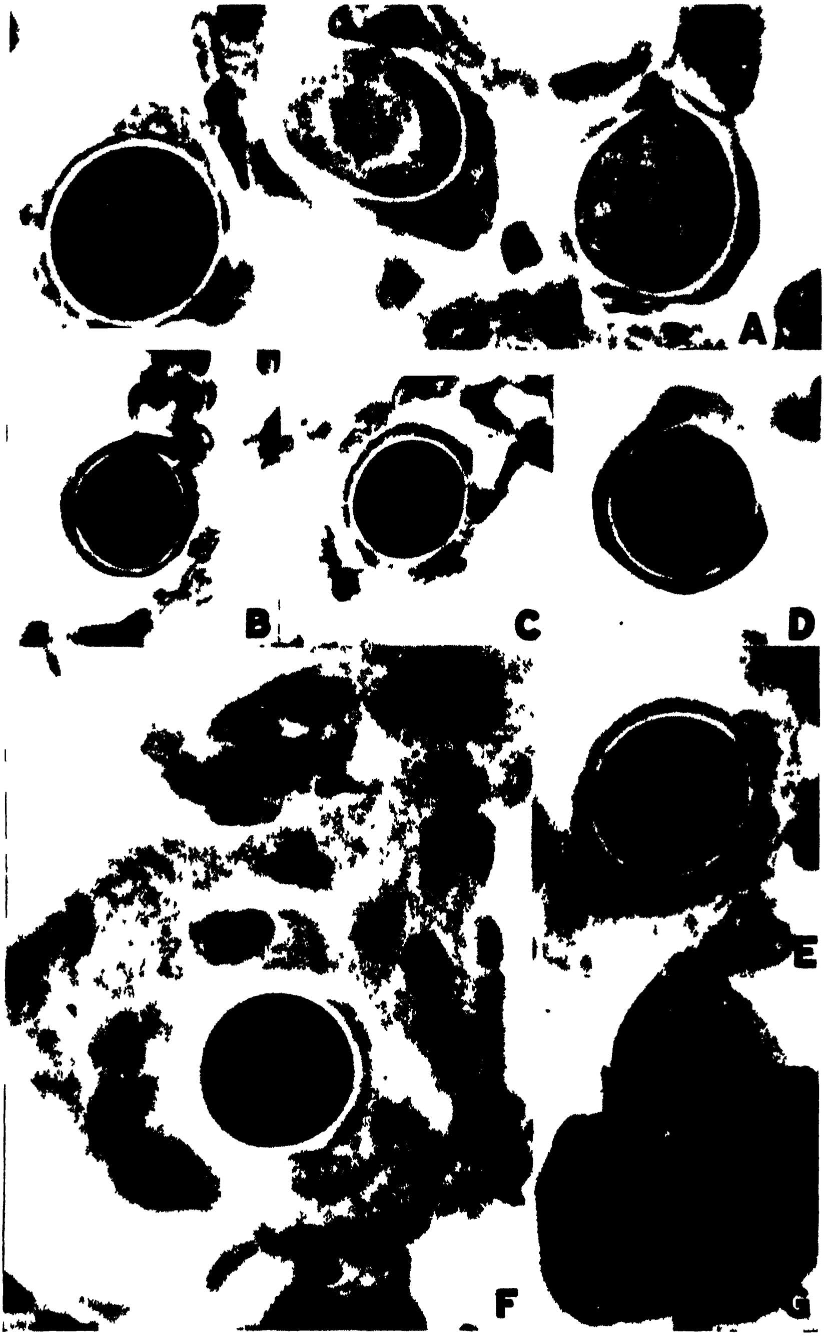

FIGURE 5.—A to F. Higher magnification of fungus cells shown in figure 4. Note the variation in density and depth of staining, and, in some, a central vacuole. These fungi measure from 10 to 14 microns in diameter. There is practically no reaction to the presence of the fungi except in F. G. Photograph of mouse lung showing numerous nodular lesions. Romanowsky stain.

parvum and they shall be referred to as such. The cytoplasm of a very small percentage of these fungus cells is much less deeply stained. These individuals cannot be differentiated from *C. immitis* and are not unlike some of the fungi present within granulomas.

In contrast to the wide range in size of the intra-granulomatous fungi, *H. parvum* usually varied only between 10 and 13μ in diameter. This was true for the fungi from the same as well as those from different animals. In most lungs an occasional fungus cell measured less than 10μ, and in an occasional animal such cells represented approximately one-third of the total number seen. Fungi larger than 14μ were rarely observed.

The lack of or relatively slight reaction to the presence of *H. parvum* was a striking and surprising finding. Most fungi were within or surrounded by from 1 to 3 or 4 large angular or polygonal mononuclear cells. Usually the fungus cells were enclosed in a narrow rim of cytoplasm in which from 1 to 3 long curved nuclei were visible (figs. 5b to c). Such enclosed fungi were fixed to alveolar walls and made knobby protrusions into alveolar spaces. In some cases, particularly in lungs in which fungi were numerous, the mononuclear cell aggregations measured up to 50μ in diameter. Not infrequently more than one fungus cell was present in such a nodule and rarely a giant cell of the fusion type was present. One, rarely more, of these cells was seen in the walls of a very few granulomas.

The frequency with which *H. parvum* occurred in a given area of lung varied considerably in different animals. In a few, only one fungus cell was found after study of two cross sections of both lungs, whereas in one animal 60 were counted in a triangular lung section measuring 3 mm. on a side and 7μ thick (fig. 4). *H. parvum* was found in the sectioned lung of 74 animals. Taking the above sized section of lung (approximate) for comparison, there were 11 animals which showed 6 or more fungi per section, 9 animals with 3 to 5 fungi, and in 54 cases there were 2 or fewer fungi per section. These fungi were no more numerous (average) in lungs showing granulomas than in lungs without such lesions.

It is clear that *H. parvum* is not a contaminant. Between 24 and 48 hours after pieces of infected lung are placed on acid dextrose agar slants one can see with a 10X lens that a fungus has begun to grow. This is manifested by minute, barely visible hyphae which appear over all or most of the surface of the lung tissue. Under the same circumstances, a contaminant, which is usually present in or on the fresh lung tissue as one or a few spores, first appears as a single colony which makes a considerable growth before invading the rest of the inoculum. Evidence on this point is not valid unless a very careful examination is made with a good lens before growth is visible to the naked eye, and it may be misleading if Mucor is present as a

contaminant. Other fungi, including species of Penicillium, Aspergillus, and Actinomyces, appeared in some cultures but were readily recognized as contaminants. Further, *H. parvum* was frequently isolated from certain species of rodents and only rarely from other animals. An analysis of the figures which follow supply further evidence that *H. parvum* is not a contaminant.[6] This fungus was isolated from 63 of 74 animals in which *H. parvum* was seen in tissue sections. Of 61 animals in which no fungi were seen microscopically, *H. parvum* was isolated from only 11. In view of the fact that a much greater bulk of lung was planted on culture medium than was studied histologically, it is not surprising that certain cases were negative by histological examination but positive by culture.

Finally, although conspicuous progressive lesions have not yet been produced experimentally in animals, the fungus has been recovered in culture from white mice several months after intranasal inoculation, and it produces in these animals the type of microscopic lesion with which it is associated in wild rodents trapped in the field. Koch's postulates have therefore been fulfilled with respect to the microscopic lesions. The granulomatous lesions have not yet been experimentally reproduced. The relationship of *H. parvum* to granulomas is not yet clear. Evidence for and against an etiological relationship is discussed in the following paragraphs.

Can the isolation of this fungus be explained by postulating the existence of a widespread new fungus infection of rodents unrelated to coccidioidomycosis? Some observations suggest this possibility. *H. parvum* appears to be associated most frequently with the type of fungus cell which is found outside grossly visible lesions, as described above (table 2), and in this respect differs from *C. immitis*. In most of the individual animals from which both *C. immitis* and *H. parvum* were isolated in culture, *C. immitis* was obtained from a nodular lesion and *H. parvum* from grossly normal lung tissue.

On the other hand, in 24 of the 117 animals (table 2) *H. parvum* only was isolated from nodules. The isolation of *H. parvum* in cultures made from macroscopic lesions freed so far as possible from adjacent lung tissue strongly suggests that *H. parvum* may be related etiologically to granulomas. In these cases when the lesion was crushed and spread over the surface of the agar slant *H. parvum* came up in pure culture at very numerous points on the inoculated agar surface. These nodules were grossly indistinguishable from those yielding *C. immitis*, and a careful histological study of pathological material did not permit a separation of granulomas into two categories based on etiology. In making cultures, if both fungi had been present in the inoculum, one would expect *C. immitis* to be isolated

[6] *C. immitis* was also isolated from a number of these animals.

invariably and *H. parvum* to be lost unless special care was taken to separate and save it. The former grows more rapidly and produces more spores than the latter, thus increasing the relative abundance of separate viable elements of *C. immitis* in a sample of mixed inoculum. In cases where a mixture of the two fungi was actually known to be present in a culture, great difficulty was experienced in isolating *H. parvum* from the mixture, while *C. immitis* was readily isolated. Further, in considering the species distribution it seems improbable that two separate mycoses occur commonly in this area in pocket mice and kangaroo rats and very rarely in deer mice which live in precisely the same terrain and occupy adjacent burrows.

Additional evidence indicating a probable relationship of *H. parvum* to coccidioidomycosis is furnished by the use of a skin test. A skin testing antigen (C. 2) was prepared from *H. parvum* following the procedures used in making coccidioidin. With the assistance of Mrs. Mabel C. Head, field nurse in the Indian Service, this material was used in skin testing Indian school children at San Carlos and at Fort Apache, an adjacent area in which only about 15 percent of the school children react to coccidioidin (*1*). The results of this testing are shown in table 3. The percentage of coccidioidin reactions observed in the San Carlos area during this study is lower than reported by Aronson et al. (*1*), because the second test with a larger dose of coccidioidin was not made. The fact that reactions to the two testing materials did not run exactly parallel is probably due in part to a lower potency of C. 2. This lot of material was prepared from cultures which grew only 6 weeks before being processed. In spite of the discrepancies appearing in table 3, the fact that 29 of 33 reactions to C. 2 occurred in individuals who also reacted to coccidioidin probably indicates an antigenic relationship, although the possibility of a dual sensitivity must be considered. This probable antigenic relationship, the circumstances under which *H. parvum* was isolated from rodents, resemblances of the two fungi in lung tissue, and the results of laboratory investigations lead to the conclusion that *H. parvum* is genetically related to *C. immitis* and in some manner to coccidioidomycosis.

TABLE 3.—*Reactions of school children in two contrasting areas, injected intradermally on one arm with lot No. 9 of coccidioidin (Dr. C. E. Smith), and on the other arm with C.2*

	125 children tested at San Carlos		123 children tested at Fort Apache	
	Positive to coccidioidin 1:1000	Negative to coccidioidin 1:1000	Positive to coccidioidin 1:1000	Negative to coccidioidin 1:1000
Positive to C.2 1:100	27	2	2	2
Negative to C.2 1:100	65	31	5	114

The preliminary skin testing studies indicate a necessity for further investigation of a question which was constantly in mind throughout the studies made in Arizona; viz, can the prevalence of skin hypersensitivity to coccidioidin in a population in which clinically apparent coccidioidomycosis is relatively infrequent be due to exposure to a fungus less virulent than *C. immitis*, but possessing an antigen in common with it? *H. parvum* seems to fulfill some of the specifications of such a fungus. It is relatively avirulent for experimental animals; it is present in an animal reservoir in at least one area in which Coccidioides also is known to be present, and residents of that area react to the intradermal injection of an antigen prepared from it. Skin hypersensitivity to coccidioidin has not yet been experimentally produced by *H. parvum*, however. Variability of fungi appearing either spontaneously or in response to some external stimulus such as radiation is a frequently observed phenomenon. It is possible that *H. parvum* may be a mutant of *C. immitis* which arises under desert conditions or is induced when spores of *C. immitis* are inhaled by certain relatively resistant animal hosts such as pocket mice.

If despite great morphological differences in culture, *H. parvum* is genetically related to *C. immitis*, it provides for the latter a hitherto unrecognized point of attachment to the Phycomycetes. It may be pointed out further that there is a remarkable resemblance in culture between *H. parvum* and two other pathogenic fungi, *Blastomyces dermatitidis* and *Histoplasma capsulatum*. The discovery of this fungus therefore supplies evidence which may indicate a closer relationship than has been previously recognized between the etiological agents of coccidioidomycosis, blastomycosis, and histoplasmosis, and between these Fungi Imperfecti and the Phycomycetes. A consideration of these points will be presented in a later paper.

SUMMARY

Typical strains of *Coccidioides immitis* were isolated from the lung in 15 percent of pocket mice and 17 percent of kangaroo rats trapped in the vicinity of San Carlos, Ariz. The histology of the lung lesions found in these rodents and the fungi present in them are briefly described. The frequency of the infection and the character of the lesions support a suggestion that rodents may constitute a reservoir of coccidioidomycosis important in the distribution and epidemiology of the disease in man. *Haplosporangium parvum* n. sp. was isolated from 101 of 128 rodents with or without grossly visible lung lesions and *C. immitis* was isolated from 25. These numbers include 9 animals from which both fungi were isolated. *H. parvum* was most often found in minute pulmonary lesions reaching 50μ in diameter and consisting of aggregations of large coherent mononuclear cells. This type of lesion was reproduced in white mice inoculated intranasally,

and *H. parvum* was isolated from these animals several months after inoculation. Evidence is presented which suggests that this fungus is also sometimes etiologically related to granulomas indistinguishable from those produced in rodents by *C. immitis*.

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CHAULMOOGRA OIL IN THE TREATMENT OF LEPROSY

By G. W. McCoy, *Medical Director (Retired), United States Public Health Service*

There is a widespread belief among the members of the medical profession that chaulmoogra oil and its derivatives are valuable—specifically curative agents—in the treatment of leprosy. This is in marked contrast with the views expressed by many experienced

students of the disease especially when the subject is discussed privately. My own observations have led me to the conclusion that the oil and its derivatives are of little or no curative value, and that the unpleasant side effects probably outweigh any advantage to the patient that might possibly accrue from their use. I am not prepared, however, to go so far as Lara (*1*) who expressed the opinion that unless cases are carefully selected great harm may be done and even that death may be hastened by unwise treatment. Lara, whose experience has been wide, believes that the oil is of great value in suitable cases. Of course, many therapeutic agents are potentially harmful if improperly used but this alone is not enough to condemn them.

I can no better illustrate the faith some teachers of medicine or therapeutics must have in the value of chaulmoogra oil and its derivatives than to relate the experience I have had with young medical graduates who have taken the examinations of the National Board of Medical Examiners. In response to a question involving a comparison of certain features of tuberculosis and leprosy, occasionally a candidate would state in effect that as a last resort in a case of doubtful diagnosis a therapeutic test might be tried using chaulmoogra oil. If the patient recovered, the diagnosis of leprosy was established.

The confidence some physicians have in the efficacy of the oil is demonstrated by the following experience. I was studying the records on leprosy in a hospital, in an endemic focus where the disease is encountered perhaps two or three times each year. One patient had been under observation for over 2 years without a definite diagnosis. In February 1937 an ulnar nerve was reported as being enlarged and then suspicion of leprosy was aroused. The following note in the history is found under a May 1937 date, "evidence of leprosy sufficient to warrant a therapeutic test with chaulmoogra oil." This note was made by, or at the direction of, a physician who had had considerable experience with the diagnosis and treatment of leprosy.

A recently published work (*2*) would make treatment of leprosy with chaulmoogra oil or its derivatives an important feature in a campaign for the suppression of the disease. This would be logical provided the drug exerted a definitely curative effect—as, for example, the arsphenamine compounds do in syphilis.

Chaulmoogra oil is so well established that in addition to being favorably referred to in practically all textbooks dealing with the treatment of the disease, we find it in the U. S. Pharmacopoeia XI.

It is understood that it is the general policy of pharmacopoeial authorities to recognize not only remedial agents of established value but also those in extensive use.

There are two publications of the American Medical Association

designed to aid the physician in the selection of therapeutic agents—New and Non-Official Remedies (1941) and Useful Drugs (1940). The former states (p. 188) that the bulk of the evidence indicates that chaulmoogra oil is of value though not having specific, curative properties. The latter, under the heading of "Actions and Uses" of chaulmoogra oil, states (p. 73), "It is of some value in affording relief of symptoms, but it does not effect a cure"—a statement at variance with the views of those who advocate the use of the oil and of those who regard it as valueless.

To illustrate the attitude of certain authorities, Stanley (*3*) and his associates introduce a chemical and a bacteriological study with the statement, "Chaulmoogra oil and related compounds have been used as specifics against leprosy for several centuries." These authors quote from a paper published by the League of Nations on the prophylaxis of leprosy (*4*) which includes this statement, "Treatment by chaulmoogra oil and its derivatives is efficacious, however we may explain its action."

The published reports on the use of the oil are so nearly unanimously in its favor that it seems unnecessary to cite many individual authorities other than those already mentioned. I will present evidence contrary to what has been the generally accepted view, not only of clinical observers but also of some research workers. I will make no attempt to present a full review of the literature, but will cite what seem to me to be the most significant reports.

According to many authors chaulmoogra oil has been used in leprosy for centuries. My own somewhat cursory review of the literature has gone back no further than publications in the present century with a single exception of the work of Hansen and Looft (*5*) who treated five cases (three nodular and two anaesthetic) for from 8 months to 1 year and sum up their experience with the words, "Results were as with other remedies, nil." It is recognized that this opinion is seriously, possibly fatally, defective as evidence because of the small number of cases, but it is thought worth presenting on account of the standing of the authors who were scientifically second to none among the students of the disease of almost half a century ago.

McCoy and Hollmann (*6*) reported on the use of the oil in 16 cases, 10 of which were recorded as improved, only 1 to the extent that acid fast bacilli could not be found. These authors called attention to some unpleasant consequences that occurred in their small series but concluded that the oil is helpful in many cases—perhaps the majority.

A review of this experience by the senior author after 25 years have elapsed leaves him with the opinion that not enough consideration

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was given to the natural evolution of leprosy, i. e., the tendency of many cases to improve spontaneously, and to the extreme meagerness of the data, which were insufficient for even the modest conclusion that was drawn. Indeed, the observations of the quarter of a century that has passed have left the senior author with the very definite impression that chaulmoogra oil and its derivatives are of doubtful value in the treatment of leprosy.

Renewed interest in the treatment of leprosy with chaulmoogra oil came in 1920 with the report from Hawaii of McDonald and Dean (*7*). These authors appear to have been well impressed with various therapeutic agents in the treatment of the disease since they say, "Of the long list of drugs and remedies used against leprosy by various authorities we have nothing derogatory to state" and assert that they have great faith in strychnine. They also say that arsenous acid and Gurjun oil and several other remedies have maintained their good reputation. These authors used the derivatives of the oil called ethyl esters, chiefly by hypodermic injection. These preparations had been studied about 20 years earlier from the chemical point of view. They report on their clinical experience over a period of 18 months, ended December 31, 1919, during which time over 25 percent of the cases treated apparently became arrested or cured—in the authors' words, "apparently clinically and bacteriologically free from the disease."

In a later paper (May 1921) (*8*) even better results were reported by the same observers, 50 percent of the patients having improved and been paroled. Up to the time of publication no relapse had been reported. So favorably impressed were these authors with their results that in the same paper they reported that the use of the remedy at the Leprosy Receiving Station in Honolulu had been changed from a voluntary basis to one in which the patient was automatically placed on the treatment as soon as he was admitted to this institution.

The very brief summary of the work of McDonald and Dean is referred to not solely to contrast with the results of others working at the same institution but to illustrate how misleading may be conclusions based on meager data and short periods of observation.

Probably a clue to the reason for reporting favorable results during a certain period in Hawaii is to be found in the observations of the late Surgeon M. H. Neill of the United States Public Health Service (*9*) who also worked at the Leprosy Receiving Station in Honolulu during a period when the mixed ethyl esters of chaulmoogra oil were used for routine treatment. A very large proportion, 70.97 percent of cases bacteriologically negative on admission, were paroled, while but 15.23 percent of cases microscopically positive on admission were paroled. All students of the disease recognize the more favorable

outlook for the bacteriologically negative cases, without respect to treatment.

The highly favorable experiences of McDonald and Dean were not duplicated by another investigator working at the same institution from which these excellent results were reported a few years earlier.

Wayson (*10*), at the conclusion of a particularly careful study of the influence of treatment in Hawaii, has this to say: "The use of chaulmoogra oil and its derivatives in Hawaii for 10 years has not been attended by results which indicate that they have any specific therapeutic value, and any effect they may have remains to be determined."

Morrow and his associates at San Francisco (*11*) point out that the esters were patented in Germany in 1909 by Ludwig Taub of Elberfeld and put on the market as antileprol. These observers treated 21 cases from 3 to 18 months over an average period of 8 months. The results were as follows: 2 died, 3 became worse, 9 showed no improvement, 2 were markedly improved, 3 slightly improved, and 2 absconded; none became bacteriologically negative. Obviously these results are what might be expected in any group of lepers without reference to special treatment.

Tomb (*12*) quotes in part the report of the Leprosy Commission, League of Nations Health Organization (1930), "There is no proof that general dietetic treatment, plus chaulmoogra oil, yields better results than general dietetic treatment alone. No conclusive evidence exists of the efficiency of chaulmoogra oil as such."

In the International Journal of Leprosy Dr. H. P. Lie (*13*), the distinguished Norwegian authority on leprosy and worthy successor of Danielssen and Hansen, published a paper on the curability of leprosy. This article is valuable from several points of view but the only one in which I am interested now is Dr. Lie's review of Danielssen's experience with chaulmoogra oil which is put in the following words, "This in the form of ol. gynocardia odoratae seemed to have no healing qualities; in fact Danielssen found it detrimental." This appraisal is what might have been expected of a master clinical observer, an observer who had the ability to give us about the middle of the last century descriptions of leprosy and a clinical classification valuable to this day. Danielssen's experience covered approximately the latter half of the last century (1849–95) and I am sure that objection will be made that he dealt only with advanced cases unfavorable from the therapeutic point of view. Dr. Lie furnishes some data which have a bearing on this by showing that 11.8 percent of all cases resulted in complete improvement and a further 9.1 percent resulted in incomplete improvement, a total of 20.9 percent that may be regarded as having improved. But there is further evidence that the cases dealt with by Danielssen were not too unfavorable—of 93 regarded as cures but 14 returned as relapsed. To illustrate further that the clinical types of that day

responded much as they do today, it was recorded that 3.5 percent of nodular cases could be regarded as cured while of the more favorable maculo-anaesthetic type 29.4 percent achieved that happy termination The summary of necropsy findings as presented by Dr. Lie supports the view that when the Norwegian medical authorities recorded a case as cured it was cured and usually remained so. It is to be kept in mind that most of the cases dealt with in those days had well-marked clinical manifestations, since much of the experience was before the days of microscopic diagnosis.

Recently I had occasion to restudy the subject with special reference to ethyl chaulmoograte. Being somewhat familiar with the published evidence and knowing well the generally favorable nature of such evidence I sought the opinions of four special students of the disease. These physicians have had from 8 to nearly 20 years of experience in the treatment of leprosy, each having had continually under observation from approximately 100 to 400 patients. It goes without saying that they are clinicians in whose judgment and open-mindedness I have great confidence and who probably would not feel that their time and energies would be profitably employed in preparing their present views for publication. The following quotations express the opinions of the four leprologists referred to above.

"I really feel that chaulmoogra oil, or its derivatives, is of little or no value in the treatment of leprosy. I should like to qualify that by saying that in lieu of anything better to offer, we deem it necessary to use it, although I do not encourage anyone to take it, especially by mouth, as it, I am sure, does a great deal of harm to many who take it orally due to its being such a gastric irritant."

"In reply to your direct question concerning chaulmoogra oil, as appended to your letter of January 16, my opinion is that chaulmoogra oil or its derivatives have not been shown to be of specific value in the treatment of leprosy.

"I make the above statement with full knowledge that many patients seem to have improved while under the treatment with this drug. However, others have not shown improvement and additional patients have shown equal improvement under the administration of other oils or esters, and under a regimen of personal and institutional hygiene without the administration of any oil."

"In my experience, chaulmoogra oil has been disappointing when viewed from results obtained over a long period. In a small percentage of cases it seems to have been of value. In most cases its value is uncertain, especially if the case is followed over a period of 5 to 10 years. It certainly has no specific action in leprosy, nor has its value, in my experience, even approached that which is usually accorded it by lay individuals and by some scientific workers."

"I have never noted any unquestionable evidence that ethyl chaulmoograte is of any value in the treatment of leprosy. During the four years that I was in charge of leprosy investigations in Hawaii, none was employed. During this period just as many patients became arrested and were removed from segregation as during previous periods when the ethyl esters were employed extensively, between twenty-five and thirty percent of all admissions becoming arrested."

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ANTRICOLA NEW GENUS, *AMBLYOMMA GERTSCHI* NEW SPECIES, AND NOTES ON *IXODES SPINIPALPIS* (ACARINA: IXODOIDEA) [1]

By R. A. Cooley, *Senior Entomologist*, and Glen M. Kohls, *Associate Entomologist, United States Public Health Service*

In recent studies of the Argasidae we have found that *Ornithodoros coprophilus* McIntosh and *O. marginatus* Banks require the erection of a new genus.

The two species included are known only from bats or bat retreats.

Antricola, new genus

Argasidae having dorsal body wall flattened and marginated; below the flattened dorsum the body convex and deep. Integument semi-translucent and the surface smooth, shining, and with tubercles. Discs absent on the venter. Mouth parts adapted for quick feeding and not for clinging to the host; hypostome convex ventrally, concave dorsally, and lacking effective denticles; chelicerae large and effective. Anal ring large. Eyes absent. Eggs small and the larvae small with bulbous pulvillae in place of claws.

[1] Contribution from the Rocky Mountain Laboratory of the Division of Infectious Diseases, National Institute of Health.

Genotype, *Ornithodoros coprophilus* McIntosh, 1935

In reviewing several lots of ticks recently sent from the American Museum of Natural History, New York, by Dr. W. J. Gertsch, associate curator of spiders, a single male specimen was found which represents a previously undescribed species and is here named for Dr. Gertsch.

Amblyomma gertschi n. sp.

MALE

Body.—Length 5.75 mm.; width 4.4 mm. Widest behind.

Scutum.—With marginal groove absent, punctations numerous, unequal, absent in four small isolated areas on each side and in a median posterior patch, which is mildly elevated giving an irregular surface. Punctations present also on the festoons which are longer than broad. Cervical grooves deep, short, divergent anteriorly. Ornamentation in scattered pattern as shown in the figure. Eyes flat and not easily seen.

Capitulum.—Broad, punctate, and with the cornua long; width, 0.84 mm. Palpi moderate in length, broader distally and with a few curved hairs; postero-dorsal point on article 2 faint, article 2 twice as long as 1; length, 0.84 mm. Hypostome with dentition arranged 3/3, limited to the terminal half.

Legs.—All tarsi with deep, dorsal, subapical grooves (to receive the stalks of the pulvillus when retracted). Tarsus I broader distally, with ventral spurs absent; all other tarsi with two ventral, subapical spurs.

Coxae.—Coxae I with two moderately long, broad subequal spurs. Coxae II and III each with a short external spur; coxa IV with a moderately long internal spur.

Genital aperture.—Placed between coxae II.

Spiracular plate.—Large, comma-shaped.

Female unknown.

Holotype, 18828, from 3-toed sloth, Barro Colorado Island, Canal Zone, March 30, 1940, and deposited in the collections of the Rocky Mountain Laboratory.

Ixodes spinipalpis Nuttall, 1916

In his Notes on Ticks IV (Parasitology, *8:* 294 (1916)), Nuttall states that in 1911 Dr. Hadwen sent him specimens with a short description and sketchy figures and labeled "*Ixodes dentatus* var. *spinipalpis* Hadwen and Nuttall 1915, n. var." Nuttall considered the specimens to be more or less closely related to *I. fuscipes* Koch, *I. dentatus* Marx 1899, and *I. boliviensis* Neumann 1904. Nuttall forwarded a female specimen to Nathan Banks, then in Washington,

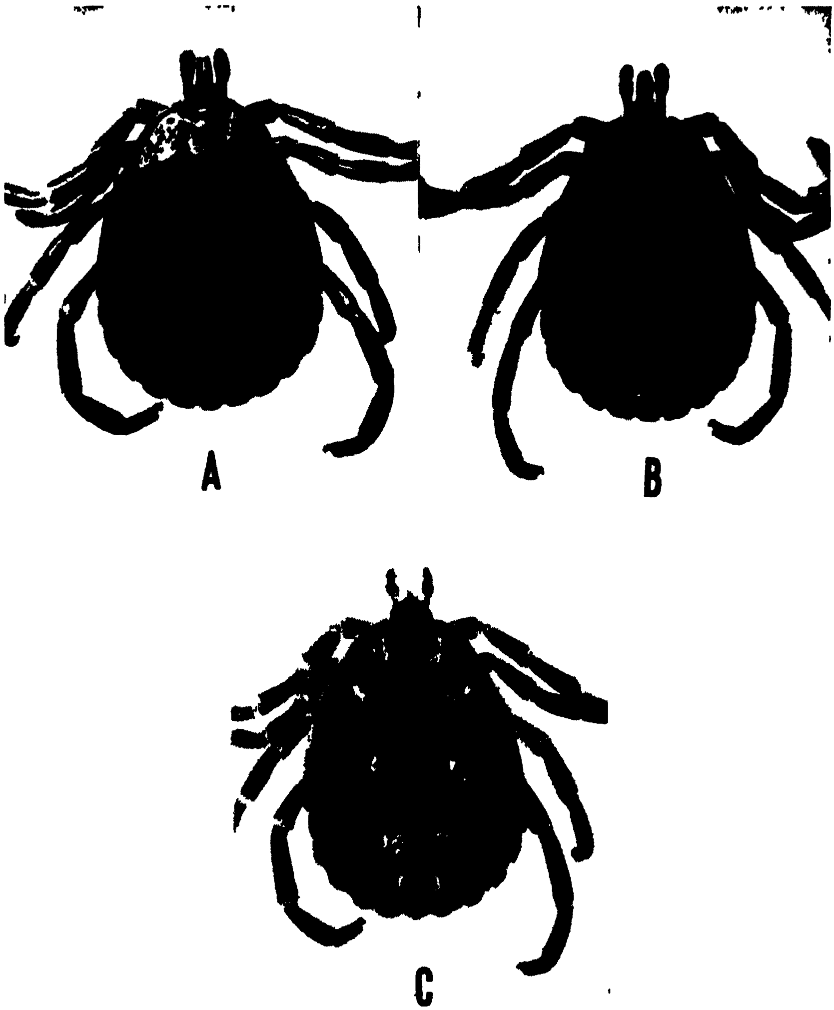

FIGURE 1.—Male of *Amblyomma gertschi* n. sp. A. Dorsal view. B. Ventral view. C. Dorsal view photographed when immersed to show the color pattern.

who compared it with the type of *I. dentatus* and his report stated that the specimen differed from *dentatus* in various particulars. On Banks' suggestion, the form was described as originally labeled by Hadwen.

The present authors find this tick described by Nuttall to be a distinct species which is not more closely related to *dentatus* than to

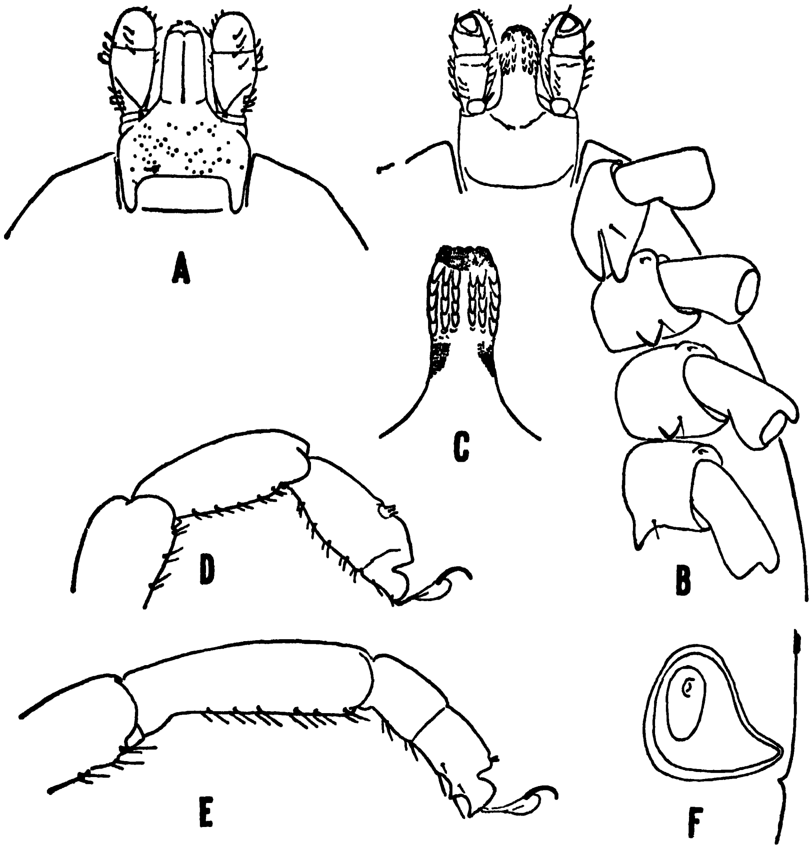

FIGURE 2.—Male of *Amblyomma gertschi* n. sp. A. Basis capituli, dorsal view. B. Basis capituli, ventral view, and coxae. C. Hypostome. D. Tarsus and metatarsus of leg I. E. Tarsus and metatarsus of leg IV. F. Spiracular plate.

other forms in the same group which are recognized as good species. We have seen specimens from the locality from which *spinipalpis*, was described and we recognize the tick to be the same as another species which had been identified as *I. diversifossus* Neumann 1899 of which we have numerous collections from Washington, Oregon, California, Idaho, and Montana. Nuttall stated, "The variety here described occurs in Western Canada on *Lepus americanus* and *Sciurus hudsonicus*." In addition to Nuttall's two hosts, the records of the

Rocky Mountain Laboratory include cottontail rabbit, wood rat, and *Peromyscus* sp.

Neumann described *I. diversifossus* from two specimens taken on raccoon, *Procyon lotor*, in New Mexico. One type is in the United States National Museum and has been studied by the senior author; the second type specimen appears to be missing. Host and locality records of the types indicate that *diversifossus* is a southern form.

The type of *diversifossus* differs from *spinipalpis* in various particulars, including the following:

Length and width of scutum in *diversifossus*, 1.38 mm. by 1.26 mm.; in *spinipalpis*, 1.28 mm. by 0.99 mm. Thus, in *diversifossus* the scutum is nearly circular and evenly rounded behind, while in *spinipalpis* it is distinctly longer than wide, has the postero-lateral margins flattened, and is well rounded behind.

Nuttall has adequately described and figured *spinipalpis* in his paper referred to above. This species should be known as *Ixodes spinipalpis* Nuttall 1916, not *Ixodes dentatus* var. *spinipalpis* Hadwen and Nuttall 1915.

DEATHS DURING WEEK ENDED OCTOBER 31, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 31, 1942	Corresponding week 1941
Data from 87 cities of the United States:		
Total deaths	8,495	7,012
Average for 3 prior years	7,843	
Total deaths, first 43 weeks of year	355,821	355,286
Deaths per 1,000 population, first 43 weeks of year, annual rate	11.7	11.6
Deaths under 1 year of age	697	562
Average for 3 prior years	519	
Deaths under 1 year of age, first 43 weeks of year	24,561	22,469
Data from industrial insurance companies:		
Policies in force	65,108,406	64,581,852
Number of death claims	11,834	10,738
Death claims per 1,000 policies in force, annual rate	9.5	8.7
Death claims per 1,000 policies, first 43 weeks of year, annual rate	9.2	9.5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WLEK ENDED NOVEMBER 7, 1942

Summary

Of the nine communicable diseases included in the following table and for which comparable weekly figures are available for prior years, the incidence of only two—influenza and meningococcus meningitis—is above the 5-year (1937–41) median expectancy for the current week.

A total of 59 cases of meningococcus meningitis was reported as compared with 68 for the preceding week. The highest incidence rate was recorded for the eastern and western States. No cases were reported in the West South Central and Mountain States. The total number of cases reported to date this year exceeds that for the corresponding period of any other year since 1937.

Of a total of 1,576 cases of influenza, 68 percent were reported in three States—Texas 602, South Carolina 285, and Virginia 187.

Of 19 cases of infectious encephalitis, 9 cases were reported in California, and of 100 cases of endemic typhus fever, 36 occurred in Georgia and 32 in Texas. A total of 3,114 cases of endemic typhus fever has been reported this year to date—a larger number than has been reported in the United States for any full year.

The death rate for the current week for 88 large cities in the United States is 11.6 per 1,000 population, as compared with 12.0 for the preceding week and 11.1 for the 3-year (1939–41) average.

For the first 9 months of 1942 the provisional birth and death rates for the United States are 20.1 and 10.3, respectively, per 1,000 population, as compared with 18.7 and 10.7 for the corresponding period of last year.

Telegraphic morbidity reports from State health officers for the week ended November 7, 1942, and comparison with corresponding week of 1941 and 5-year median

cases may have occurred.

Division and State	Diphtheria: Week ended Nov. 7, 1942	Diphtheria: Week ended Nov. 8, 1941	Diphtheria: Median 1937-41	Influenza: Week ended Nov. 7, 1942	Influenza: Week ended Nov. 8, 1941	Influenza: Median 1937-41	Measles: Week ended Nov. 7, 1942	Measles: Week ended Nov. 8, 1941	Measles: Median 1937-41	Meningitis, meningococcus: Week ended Nov. 7, 1942	Meningitis, meningococcus: Week ended Nov. 8, 1941	Meningitis, meningococcus: Median 1937-41
NEW ENG.												
Maine	1	0	1	...	...	...	0	54	37	2	0	0
New Hampshire	0	1	0	2	...	...	21	1	1	0	0	0
Vermont	0	0	0	...	...	...	104	0	8	0	0	0
Massachusetts	2	3	3	...	...	...	208	79	80	4	2	0
Rhode Island	1	3	1	...	...	...	0	6	2	1	0	0
Connecticut	0	0	2	3	1	2	49	51	7	1	0	0
MID. ATL.												
New York	13	26	18	[1] 9	[1] 2	[1] 6	126	116	128	13	4	4
New Jersey	5	5	11	10	4	6	19	18	18	2	8	1
Pennsylvania	13	9	33	3	...	...	190	237	237	3	2	2
E. NO. CEN.												
Ohio	31	19	43	11	11	7	26	36	34	2	2	0
Indiana	8	20	31	17	13	13	16	5	7	0	0	1
Illinois	40	25	34	8	20	12	38	47	47	1	1	1
Michigan [2]	7	11	11	...	...	...	152	29	59	1	0	1
Wisconsin	2	5	2	27	16	21	54	95	50	1	0	0
W. NO. CEN.												
Minnesota	6	1	4	3	1	1	3	1	28	2	0	1
Iowa	1	6	5	2	...	...	25	20	20	0	0	0
Missouri	5	4	13	...	6	6	9	8	13	1	0	0
North Dakota	3	2	4	...	4	...	1	91	1	1	1	0
South Dakota	9	5	3	...	1	...	0	1	2	1	0	0
Nebraska	14	7	6	1	...	1	47	2	2	0	0	0
Kansas	4	2	6	2	9	4	0	53	22	0	1	1
SO. ATL.												
Delaware	0	0	0	...	...	...	0	1	1	0	0	0
Maryland [3]	6	22	16	5	1	3	18	28	6	7	2	0
Dist. of Col	1	0	2	1	2	...	0	1	0	1	0	0
Virginia	25	36	63	187	157	74	2	62	28	2	1	1
West Virginia	32	16	21	20	9	9	7	179	14	0	1	1
North Carolina	65	94	117	...	1	2	4	53	101	0	1	2
South Carolina	50	23	23	285	221	221	2	22	9	0	0	0
Georgia	25	32	42	38	36	31	1	14	4	1	0	0
Florida	8	5	11	3	7	2	2	5	14	0	0	0
E. SO. CEN.												
Kentucky	16	22	24	5	4	7	14	24	24	2	1	2
Tennessee	8	7	21	17	7	25	18	4	6	1	0	1
Alabama	39	34	34	42	49	49	3	12	9	0	1	2
Mississippi [3]	17	16	17	...	...	...	...	...	...	1	2	0
W. SO. CEN.												
Arkansas	19	15	19	31	42	42	2	9	4	0	0	0
Louisiana	14	9	12	2	13	3	0	0	1	0	2	0
Oklahoma	15	14	22	22	35	33	1	31	1	0	0	0
Texas	64	79	58	602	1,392	218	18	44	28	0	1	1
MOUNTAIN												
Montana	0	6	1	4	5	5	11	15	15	0	1	0
Idaho	0	0	0	...	...	...	28	3	3	0	0	0
Wyoming	0	1	0	45	7	...	4	2	3	0	0	0
Colorado	11	23	7	88	21	7	12	21	21	0	0	0
New Mexico	1	2	2	...	...	1	1	5	14	0	0	0
Arizona	4	5	4	26	76	57	4	54	3	0	0	0
Utah [3]	0	0	0	3	14	2	191	9	10	0	0	0
Nevada	0	0	...	5	...	...	6	0	...	0	0	...
PACIFIC												
Washington	6	0	1	3	3	...	205	1	20	3	0	0
Oregon	1	12	4	17	10	12	89	15	10	3	0	0
California	27	14	18	27	108	22	40	228	149	2	4	1
Total	619	641	857	1,576	2,308	996	1,771	1,792	1,792	59	33	32
44 weeks	12,408	13,000	18,657	91,272	501,817	176,684	476,152	835,413	356,340	2,970	1,737	1,737

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 7, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Nov. 7, 1942	Nov. 8, 1941		Nov. 7, 1942	Nov. 8, 1941		Nov. 7, 1942	Nov. 8, 1941		Nov. 7, 1942	Nov. 8, 1941	
NEW ENG.												
Maine	0	0	0	8	7	10	0	0	0	0	1	2
New Hampshire	2	0	0	12	9	6	0	0	0	0	0	0
Vermont	1	2	0	2	1	3	0	0	0	0	0	0
Massachusetts	0	4	1	182	190	95	0	0	0	7	1	1
Rhode Island	0	1	0	1	5	6	0	0	0	1	0	0
Connecticut	3	1	0	30	17	30	0	0	0	0	1	1
MID. ATL.												
New York	10	39	10	181	151	173	0	0	0	7	7	12
New Jersey	4	8	5	62	65	61	0	0	0	0	0	2
Pennsylvania	1	6	6	166	133	216	0	0	0	9	9	12
E. NO. CEN.												
Ohio	3	15	10	233	219	227	0	0	0	6	9	12
Indiana	2	0	2	42	36	109	2	1	3	2	1	4
Illinois	20	15	15	186	155	213	0	1	2	2	2	6
Michigan [3]	0	6	6	66	91	169	0	1	1	3	2	3
Wisconsin	4	12	7	179	115	119	0	0	2	0	0	0
W. NO. CEN.												
Minnesota	1	10	10	69	49	68	0	0	3	3	0	0
Iowa	2	2	12	55	45	54	1	0	3	0	0	1
Missouri	4	0	1	48	39	70	1	0	1	5	4	5
North Dakota	0	1	0	10	4	17	0	0	0	0	0	0
South Dakota	2	1	1	38	12	18	0	0	1	0	0	1
Nebraska	5	0	4	15	11	12	0	0	0	0	0	0
Kansas	4	1	2	49	71	71		0	1	0	2	2
SO. ATL.												
Delaware	0	0	0	6	2	6	0	0	0	0	1	1
Maryland [4]	0	2	0	56	38	38	0	0	0	5	7	7
Dist. of Col.	0	2	0	14	13	10	0	0	0	0	0	1
Virginia	1	8	1	88	70	49	0	0	0	1	12	9
West Virginia	0	1	1	49	62	74	0	0	0	3	1	9
North Carolina	1	1	1	135	80	88	0	0	0	6	2	5
South Carolina	0	1	0	12	16	21	0	0	0	2	3	3
Georgia	0	2	1	41	31	31	0	1	0	1	8	7
Florida	1	0	0	7	1	11	0	0	0	3	1	1
E. SO. CEN.												
Kentucky	2	5	5	64	53	53	0	0	0	5	7	12
Tennessee	0	14	1	59	26	49	0	0	0	1	1	7
Alabama	2	6	1	39	22	24	0	0	0	2	0	4
Mississippi [3]	2	4	2	24	6	12	0	0	0	1	2	2
W. SO. CEN.												
Arkansas	3	0	1	11	6	14	0	0	1	2	8	8
Louisiana	2	0	1	9	7	11	0	0	0	4	5	7
Oklahoma		3	2	35	17	23	1	0	1	12	1	9
Texas	10	4	4	38	47	47	1	0	2	6	17	17
MOUNTAIN												
Montana	0	3	0	9	26	26	0	0	0	1	0	1
Idaho	0	2	1	4	8	10	0	1	1	0	1	2
Wyoming	0	0	0	0	17	8	0	0	0	0	1	1
Colorado	2	0	0	31	13	35	0	0	0	1	1	2
New Mexico	0	0	0	3	5	8	0	0	0	3	0	5
Arizona	0	0	0	2	1	6	0	0	0	2	0	2
Utah [3]	0	3	3	6	6	17	0	0	0	1	0	1
Nevada	0	0	------	1	3	------	0	0	------	0	0	------
PACIFIC												
Washington	3	1	1	39	52	25	0	0	1	0	0	8
Oregon	0	0	0	6	10	17	0	0	1	1	0	0
California	8	5	5	134	83	130	0	0	0	8	3	7
Total	105	191	191	2,556	2,146	2,659	6	5	55	111	116	259
44 weeks	3,624	8,356	8,356	105,407	104,796	135,828	689	1,220	8,861	6,112	7,621	11,530

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 7, 1942—Continued

Division and State	Whooping cough, Week ended Nov. 7, 1942	Whooping cough, Week ended Nov. 8, 1941	Week ended November 7, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	50	16	0	0	0	0	0	0	0	0	0
New Hampshire	0	13	0	0	0	0	0	0	0	0	0
Vermont	22	17	0	0	0	0	0	0	0	0	0
Massachusetts	170	172	0	0	11	0	1	0	0	0	0
Rhode Island	24	18	0	0	0	0	0	0	0	0	0
Connecticut	80	66	0	0	3	0	0	0	0	0	0
MID. ATL.											
New York	405	459	0	1	10	0	1	0	0	0	0
New Jersey	158	173	0	2	0	0	0	0	1	0	0
Pennsylvania	334	250	0	0	0	0	1	0	1	0	1
E. NO. CEN.											
Ohio	124	222	0	0	3	0	0	0	0	0	0
Indiana	29	9	0	0	0	0	0	0	0	0	0
Illinois	217	215	0	0	0	0	1	0	0	0	0
Michigan [2]	155	257	0	4	0	0	0	0	0	0	0
Wisconsin	151	252	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	40	45	0	0	1	0	0	0	0	0	0
Iowa	11	27	0	0	0	0	0	0	0	0	0
Missouri	9	3	0	0	0	1	1	0	0	0	0
North Dakota	15	9	0	0	0	0	0	0	0	0	0
South Dakota	9	26	0	0	0	0	0	0	0	0	0
Nebraska	3	6	0	0	0	0	0	0	0	0	0
Kansas	30	56	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	7	0	1	0	0	0	0	0	0	0	0
Maryland [2]	81	45	0	0	0	7	1	0	0	0	0
District of Columbia	7	6	0	0	0	0	0	0	0	0	0
Virginia	44	87	0	0	0	32	0	0	2	0	0
West Virginia	12	64	0	0	0	0	0	0	0	0	0
North Carolina	63	113	0	0	0	0	0	0	0	0	1
South Carolina	30	34	0	0	2	0	0	0	0	0	5
Georgia	16	19	0	1	2	0	0	0	0	0	36
Florida	4	17	0	0	1	0	0	0	0	0	7
E. SO. CEN.											
Kentucky	30	123	0	0	2	0	0	0	0	1	0
Tennessee	14	15	0	0	0	12	0	0	0	0	3
Alabama	28	8	0	0	0	0	0	0	0	1	11
Mississippi [2]	------	------	0	0	0	0	0	0	0	0	2
W. SO. CEN.											
Arkansas	30	16	0	1	1	0	0	0	0	2	0
Louisiana	3	6	0	1	*2	0	0	2	0	0	1
Oklahoma	0	4	0	0	0	0	0	0	0	0	0
Texas	77	115	0	4	150	0	3	0	0	0	32
MOUNTAIN											
Montana	7	43	0	0	0	0	0	0	0	0	0
Idaho	1	4	0	0	0	0	0	0	0	0	0
Wyoming	17	2	0	0	0	0	0	0	0	0	0
Colorado	14	32	0	0	1	0	0	0	0	0	0
New Mexico	8	7	0	1	9	0	0	0	0	0	0
Arizona	2	25	0	0	0	5	1	0	0	0	0
Utah [2]	11	27	0	0	0	1	0	0	0	0	0
Nevada	1	1	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	13	98	0	0	0	0	0	0	0	0	0
Oregon	3	24	0	0	0	0	0	0	0	0	0
California	245	142	0	1	9	0	9	0	0	0	1
Total	2,804	3,388	1	16	207	58	19	2	4	4	100
44 weeks	152,531	180,873	------	------	------	------	------	------	------	------	------

[1] New York City only.
*Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended Oct. 24, 1942

This table lists the reports from 86 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza: Cases	Influenza: Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Baltimore, Md	0	0	2	2	3	7	9	0	6	0	1	53
Billings, Mont	0	0	------	0	0	0	1	0	0	0	0	3
Birmingham, Ala	2	0	2	1	0	0	1	0	3	0	2	0
Boise, Idaho	0	0	------	0	0	0	0	0	0	0	0	0
Boston, Mass	0	0	------	0	8	0	12	2	37	0	1	46
Bridgeport, Conn	0	0	2	3	0	0	1	0	2	0	0	0
Brunswick, Ga	0	0	------	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	------	1	15	1	6	0	4	0	0	8
Camden, N. J	0	0	------	0	1	0	0	0	3	0	0	9
Charleston, S. C	1	0	3	0	0	0	0	0	0	0	0	0
Charleston, W. Va	0	0	------	0	0	0	0	0	1	0	0	0
Chicago, Ill	8	0	1	0	5	0	19	4	23	0	1	73
Cincinnati, Ohio	5	0	------	1	4	0	2	2	18	0	1	13
Cleveland, Ohio	2	0	5	0	0	1	7	0	24	0	0	69
Columbus, Ohio	0	0	------	0	0	0	3	0	18	0	0	5
Concord, N. H	0	0	------	0	0	0	0	1	0	0	0	0
Cumberland, Md	0	0	------	0	0	0	0	0	0	0	0	0
Dallas, Texas	3	0	------	0	0	0	2	0	6	0	2	1
Denver, Colo	6	0	17	0	2	1	3	0	6	0	0	6
Detroit, Mich	6	1	------	0	12	0	10	0	18	0	0	99
Duluth, Minn	0	0	------	0	0	0	1	0	5	0	0	8
Fall River, Mass	0	0	------	0	1	0	1	0	3	0	0	2
Fargo, N. Dak	0	0	------	0	1	0	0	0	2	0	0	0
Flint, Mich	0	0	------	0	0	0	0	0	1	0	0	4
Fort Wayne, Ind	0	0	------	0	0	0	1	0	0	0	0	0
Frederick, Md	0	0	------	0	0	0	0	1	0	0	0	0
Galveston, Texas	0	0	------	0	0	0	0	0	1	0	0	0
Grand Rapids, Mich	0	0	------	0	0	0	2	0	1	0	0	5
Great Falls, Mont	0	0	------	0	1	0	2	0	0	0	0	4
Hartford, Conn	0	0	3	0	0	1	0	0	3	0	0	19
Helena, Mont	0	0	------	0	0	0	0	0	1	0	0	0
Houston, Tex	2	0	------	0	0	0	10	1	0	2	0	14
Indianapolis, Ind	0	0	------	0	1	0	7	0	9	0	0	6
Kansas City, Mo	1	0	------	0	1	0	7	0	18	0	0	1
Kenosha, Wis	0	0	------	0	0	0	0	0	4	0	0	3
Little Rock, Ark	0	0	--	0	0	0	1	0	1	0	0	0
Los Angeles, Calif	6	0	14	2	9	3	11	7	20	0	1	37
Lynchburg, Va	2	0	----	0	0	0	0	0	1	0	1	2
Memphis, Tenn	0	0	------	0	1	0	3	0	6	0	1	18
Milwaukee, Wis	0	0	------	0	16	0	0	0	42	0	0	36
Minneapolis, Minn	2	0	------	0	2	0	7	2	18	0	0	6
Missoula, Mont	0	0	------	0	0	0	1	0	0	0	0	0
Mobile, Ala	0	0	------	2	0	0	4	0	1	0	1	2
Nashville, Tenn	0	0	------	0	0	0	1	0	1	0	0	0
Newark, N. J	0	0	4	0	10	0	5	1	9	0	0	20
New Haven, Conn	0	0	------	0	0	0	3	0	1	0	0	18
New Orleans, La	0	0	4	4	0	0	3	0	1	0	0	0
New York, N. Y	17	1	12	0	10	8	38	2	66	0	6	127
Omaha, Nebr	0	0	------	0	1	0	3	0	4	0	0	2
Philadelphia, Pa	2	0	1	0	77	2	25	1	21	0	2	124
Pittsburgh, Pa	5	0	2	2	3	0	12	0	9	0	2	6
Portland, Maine	0		------	0	1	0	2	0	4		0	18
Providence, R. I	2	0	------	0	0	0	0	0	2	0	0	17
Pueblo, Colo	1	0	------	0	1	0	2	0	0	0	0	0
Racine, Wis	1	0	------	0	0	0	1	0	0	0	0	3
Raleigh, N. C	1	0	------	0	0	0	0	0	5	0	0	15
Reading, Pa	0	0	------	0	0	0	0	0	0	0	0	1
Richmond, Va	0	0	------	0	0	0	5	0	2	0	1	4

City reports for week ended Oct. 24, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Roanoke, Va	0	0	------	0	0	0	0	0	2	0	0	0
Rochester, N. Y	0	0	------	0	0	0	1	0	3	0	0	6
Sacramento, Calif	2	0	------	0	0	0	1	0	6	0	0	1
Saint Joseph, Mo	0	0	------	0	0	0	3	0	1	0	0	0
Saint Louis, Mo	1	0	------	0	0	0	11	0	15	0	0	3
Saint Paul, Minn	0	0	------	0	2	0	3	0	3	0	0	16
Salt Lake City, Utah	0	0	------	0	25	0	0	2	0	0	0	13
San Antonio, Tex	1	0	1	1	0	0	2	3	2	0	0	3
San Francisco, Calif	1	0	------	0	2	0	13	0	4	0	0	7
Savannah, Ga	1	0	1	0	0	1	0	0	2	0	0	1
Seattle, Wash	3	0	------	0	3	0	4	0	1	0	0	7
Shreveport, La	1	0	------	0	0	0	10	0	1	0	0	0
South Bend, Ind	0	0	------	0	0	0	0	0	0	0	0	1
Spokane, Wash	1	0	1	1	7	0	2	0	2	0	0	0
Springfield, Ill	0	0	------	0	0	0	1	0	3	0	0	10
Springfield, Mass	0	0	------	0	1	0	5	0	47	0	0	3
Superior, Wis	0	0	------	0	0	0	0	0	0	0	0	1
Syracuse, N. Y	0	0	------	0	0	0	3	1	1	0	0	4
Tacoma, Wash	0	0	------	0	20	0	0	0	0	0	1	1
Topeka, Kans	0	0	------	0	0	0	0	0	1	0	0	0
Trenton, N. J	0	0	1	0	0	0	2	1	4	0	0	1
Washington, D. C	3	0	------	0	0	3	9	0	14	0	0	4
Wheeling, W. Va	0	0	------	0	1	0	0	0	3	0	0	5
Wichita, Kans	0	0	------	0	0	0	3	0	8	0	2	1
Wilmington, Del	0	0	------	1	0	0	6	0	0	0	0	2
Wilmington, N. C	3	0	------	0	0	0	4	0	0	0	0	13
Winston-Salem, N. C	0	0	------	0	0	0	1	0	8	0	1	2
Worcester, Mass	0	0	------	0	1	0	11	0	15	0	0	23

Dysentery, amebic—Cases: Baltimore, 2, Birmingham, 1; Boston, 1; Chicago, 1; Mobile, 1; New York, 2; San Francisco, 1.

Dysentery, bacillary—Cases: Baltimore, 7; Charleston, S. C., 10; Chicago, 3, Hartford, 3; Los Angeles, 4; New Haven, 1; New York, 13; Richmond, 3; St. Louis, 1; San Francisco, 1; Shreveport, 1.

Dysentery, unspecified—Cases: San Antonio, 3.

Leprosy—Cases: New Orleans, 2.

Typhus fever—Cases: Charleston, S. C., 1; Houston, 2; Mobile, 1; Nashville, 3; New Orleans, 1; Savannah, 5.

Rates (annual basis) per 100,000 population, for the group of 86 cities in the preceding table (estimated population, 1942, 33,689,009)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Oct. 24, 1942	14.26	11.78	3.26	38.44	51.00	89.28	0.31	4.19	161.21
Average for week 1937-41	16.60	9.40	[1] 5.14	[2] 54.66	[1] 38.20	85.67	0.47	5.79	155.05

[1] 3-year average, 1939-41.
[2] Median.

PLAGUE INFECTION IN TACOMA, WASHINGTON

Under date of October 27, 1942, plague infection was reported proved in 2 pools of fleas and lice from rats, *Rattus norvegicus*, taken in Tacoma, Wash., on October 9 and 10, respectively; one consisted

of 115 fleas and 81 lice from 53 rats, and the other of 100 fleas from 44 rats.

TULAREMIA INFECTION IN FIELD MOUSE IN SOUTH DAKOTA

The plague laboratory in San Francisco reports the finding of tularemia infection in a field mouse (*Microtus pennsylvanicus*) found dead on September 22, 1942, 7½ miles southwest of Newell, near U. S. Highway No. 212.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—Information dated October 12, 1942, states that 2 rats proved positive for plague were found in Paauhau area, Hamakua District, Island of Hawaii, and 1 rat proved positive for plague was found in Makawao, 9 miles from Kahului, Island of Maui. Information dated October 15, 1942, states that 2 other rats proved positive for plague were found in Paauhau area, Hamakua District, Island of Hawaii, T. H.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended October 10, 1942.—During the week ended October 10, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		2	1	2	4			1	3	13
Chickenpox	1	11		46	61	62	18	5	37	241
Diphtheria		13	2	33	2	11	1	2		64
Dysentery					1		3			4
Encephalomyelitis							1			1
German measles				3	6		3		4	16
Influenza					2		1			3
Lethargic encephalitis						2				2
Measles				77	28		8	2	8	123
Mumps		14	1	37	128	9	30	47	99	365
Pneumonia		2			10				13	25
Poliomyelitis		3	2	6	5	2			3	21
Scarlet fever		3	5	78	64	12	25	19	22	228
Trachoma									1	1
Tuberculosis	3		4	84	50	10	11	9	21	192
Typhoid and paratyphoid fever		1		21	1		1		1	25
Undulant fever				5	1					6
Whooping cough		1		287	90	20	14	78	11	501
Other communicable diseases		3		5	254	32		3	6	303

CUBA

Habana—Communicable diseases—4 weeks ended October 17, 1942.—During the 4 weeks ended October 17, 1942, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	14		Poliomyelitis	20	4
Malaria	7		Tuberculosis	7	1
Measles	3		Typhoid fever	17	1

GREAT BRITAIN

England and Wales—Infectious diseases—Years 1939, 1940, and 1941.—During the years 1939, 1940, and 1941, cases of certain infectious diseases were reported in England and Wales as follows:

Disease	Cases (including non-civilians)		
	1939	1940	1941
Cerebrospinal fever	1,500	12,771	11,077
Diphtheria (including croup)	47,341	46,281	50,797
Dysentery	1,941	2,860	6,670
Erysipelas	14,141	13,123	12,237
Lethargic encephalitis	159	211	187
Malaria	2	2	2
Measles [1]	15,879	409,521	409,715
Ophthalmia neonatorum	4,594	4,390	4,195
Pneumonia [2]	42,812	47,875	50,942
Polioencephalitis	88	128	83
Poliomyelitis	744	951	876
Puerperal pyrexia and puerperal sepsis	9,250	7,627	7,356
Scarlet fever	78,101	65,302	59,432
Smallpox	1	1	----------
Typhoid and paratyphoid fever	1,479	2,833	4,763
Typhus fever	1	----------	----------
Whooping cough	8,690	53,607	173,331

[1] Notifiable from Oct. 23, 1939.
[2] Includes influenza with pneumonic complications.

England and Wales—Vital statistics—Years 1939, 1940, and 1941.—The following table shows the numbers of births and deaths with rates per 1,000 population in England and Wales for the years 1939, 1940, and 1941 The figures for 1940 and 1941 are provisional and crude death rates are substituted for standard death rates:

	1939		1940		1941	
	Number	Rate per 1,000 population	Number	Rate per 1,000 population	Number	Rate per 1,000 population
Live births	619,352	14.9	607,029	14.6	587,228	14.2
Deaths, all causes	499,804	12.1	581,537	14.0	535,180	12.9
Maternal deaths	1,997	[1] 3.1	1,640	[1] 2.6	1,678	[1] 2.76
Infant mortality	31,190	[1] 50	33,892	[1] 56	34,550	[1] 59
Deaths from:						
Cancer	67,154	1.62	68,922	1.66	69,227	1.67
Cerebrospinal fever	517	.012	2,584	.062	2,163	.052
Diarrhea and enteritis	4,345	.105	4,433	.107	4,654	.112
Diphtheria	2,133	.051	2,480	.060	2,641	.064
Dysentery	96	.002	185	.004	329	.008
Erysipelas	248	.006	214	.005	190	.005
Influenza	8,020	.193	11,482	.277	6,901	.166
Lethargic encephalitis	572	.014	729	.018	704	.017
Malaria	20	.000	46	.001	19	.000
Measles	303	.007	857	.021	1,145	.028
Ophthalmia neonatorum	12	.000	7	.000	4	.000
Pneumonia	23,403	.564	29,195	.704	26,418	.637
Polioencephalitis	48	.001	54	.001	47	.001
Poliomyelitis	95	.002	107	.003	113	.003
Puerperal pyrexia and puerperal sepsis	402	.010	339	.008	288	.007
Scarlet fever	181	.004	154	.004	133	.003
Tuberculosis	25,623	.618	28,144	.679	28,670	.692
Typhoid and paratyphoid fever	112	.003	135	.003	148	.004
Typhus fever	----------	----------	----------	----------	1	.000
Whooping cough	1,229	.030	678	.016	2,383	.057

[1] Per 1,000 live births.

JAMAICA

Communicable diseases—4 weeks ended September 26, 1942.—During the 4 weeks ended September 26, 1942, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	4	3	Scarlet fever	1	
Diphtheria	4	3	Tuberculosis	36	64
Dysentery	2	3	Typhoid fever	6	56
Erysipelas		1	Typhus fever	3	1
Leprosy		5			

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-named diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday of each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Indochina.—For the period October 11–20, 1942, 4 fatal cases of plague were reported in Indochina.

Morocco.—For the week ended October 17, 1942, 13 cases of plague were reported in Morocco.

Typhus Fever

France (occupied zone).—During the month of September 1942, 1 case of typhus fever was reported in France (occupied zone).

Morocco.—During the week ended October 17, 1942, 39 cases of typhus fever were reported in Morocco.

Rumania.—During the week ended October 24, 1942, 8 cases of typhus fever were reported in Rumania.

Tunisia.—During the period September 21–30, 1942, 101 cases of typhus fever were reported in Tunisia.

Turkey.—During the week ended October 24, 1942, 6 cases of typhus fever were reported in Turkey. For the week ended October 3, 1942, 4 cases of typhus fever were reported instead of 44 as previously published.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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Public Health Reports

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CHLORACNE FROM CUTTING OILS

By Louis Schwartz, *Medical Director, United States Public Health Service,* and Frank A. Barlow, *Medical Director, Wright Aeronautical Corporation, Paterson, N. J.*

A request from the medical director of a large motor factory for an investigation of an outbreak of dermatitis of 6 months' duration was received by the Dermatoses Investigations Section of the United States Public Health Service in February 1942.

Examination of the medical records showed that among about 20,000 employees there had been an average of over 100 cases of dermatitis per month for the last 6 months. Most of the cases were attributed to cutting oils, although varsol and the cores and molds for magnesium castings also caused a considerable percentage of the cases.

In going through the plant, many cases of dermatitis were seen. They were mostly folliculitis, acne, and boils on the anterior surfaces of the thighs and the extensor surfaces of the arms, usually seen among those who worked with ordinary insoluble cutting oils. But in the gear grinding department the workers had in addition to the ordinary type of oil folliculitis and oil acne [1] of the arms and thighs, acnelike lesions on the face (fig. 1–A), neck, behind the ears, and even on the abdomen (fig. 1–B). These lesions consisted of small, straw-colored cysts of the sebaceous glands similar to those caused by chlornaphthalenes and chlordiphenyls (fig. 2). [2]

In the course of the inspection, it was noted that in the operation of gear grinding on the Pratt & Whitney gear grinders, a heavy mist of oil (fig. 3) is given off from the gear cutting operation. This mist envelops the worker as he stands at the machine, and covers his face and clothes with a waxy, oil-like substance. This observation led to the suspicion that the workers were coming in contact with chlorinated hydrocarbons contained in the cutting oils.

It was ascertained that a particular type of gear cutting oil was used on the gear grinding operation, but the composition of the oil was not known at the factory. The foreman in the department stated

*From the Dermatoses Investigations Section, Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service.

[1] Schwartz, Louis. Dermatitis from cutting oils. Pub. Health Rep., 56:1947–1953 (Oct. 3, 1941).

[2] Schwartz, Louis. Dermatitis from synthetic resins and waxes. Am. J. Pub. Health, 26:586–592 (June 1936).

that for the past 8 months a new oil, heavier and waxier than formerly, was being used.

Samples of the eight different cutting oils used in the plant were obtained and analyzed for chlorine content. The chlorine found in the various oils is as follows:

CHART 1

Oil:	*Chlorine content, percent by weight*
No. 1	7.0
No. 2	0.15
No. 3	0.15
No. 4	1.5
No. 5	2.0
No. 6	2.8
No. 7	0.84
No. 8	1.0

Oils were decomposed by combustion on a Par bomb and the residue was analyzed for total chlorine content by a modified Volhard method. The organic chlorine substitution products present were not identified.

Numbers 1, 5, and 6 were used in the gear grinding department. This confirmed the suspicion that chlorinated hydrocarbons were the cause of this unusual and hitherto unreported type of cutting oil acne.

As a check on these findings, a similar motor manufacturing plant was visited where the same type of oil was being used in the same operation of gear grinding. Here again it was found that most of the cases of oil acne on the face occurred among operators of the Pratt & Whitney gear grinders. A few cases were also seen on other heavy cutting operations and it was ascertained that these workers had been exposed to chlorinated oils.

Samples of the oils used in this plant were analyzed for chlorine content. The analysis showed the following:

CHART 2

Oil:	*Chlorine content, percent by weight*
No. 1	0.090
No. 2	.036
No. 3	.023
No. 4	.025
No. 5 (base)	1.309
No. 6	1.085
No. 7	.027
No. 8 (base)	4.70
No. 9	.805
No. 10	.060
No. 11	.088
No. 12	.030
No. 13	.055
No. 14	.070

Numbers 5, 6, and 9 correspond to numbers 1, 5, and 6 of chart 1. Numbers 5 and 8 are base oils which are diluted before being used.

An analysis of No. 9 was made before and after use in heavy grinding. About 25 percent of the chlorine is given off in the grinding operation, as is shown in chart 3.

CHART 3

Oil No. 9:	New oil	Used oil
Gravity A. P. I. at 60° F	23. 20	---------
Viscosity at 100° F	109. 00	121. 00
Saponification No	49. 10	30. 30
Sulfur content .... percent	0. 70	0. 70
Mineral acidity	Positive	Negative
Chlorine content .... percent	0. 86	0. 53

While these investigations were going on, reports were received of similar cases occurring in two other factories manufacturing war materials. In one of these, conditions similar to those described above were found. The same chlorinated oil was used in the machines where most of the cases occurred.

The medical director of the second plant reported that oils 5, 6, and 9 of chart 2 were used on Pratt & Whitney gear grinders where the cases of face acne occurred, and that the substitution of oils free from chlorine compounds halted the occurrence of new cases.

The makers of the oils were informed of the findings and were requested to send the ingredients of the suspected oils. The following are quotations from their replies:

"* * * Oil contains approximately 6 percent sulfur and 5 percent chlorine in combination with a fatty oil. In addition we manufacture another product which contains approximately 3½ to 4 percent sulfur and 1 to 2 percent of chlorine in combination."

"* * * Oil is composed of a normally and carefully refined petroleum oil * * * with which is appropriately incorporated special fats of an animal nature, a percentage of sulfur, and an organic chlorine-bearing material."

Biopsies were taken from one of the cases and serial sections made. These were compared with biopsies from a known case of halowax acne.

Below are the reports of Dr. S. William Becker and Dr. Samuel M. Peck on the biopsies from which figures 4 and 5 were taken:

HALOWAX ACNE

H 32.—The epidermis shows some hyperkeratotic scaling over areas of relative acanthosis. The process becomes evident as one in which we have widening of follicular openings with follicular hyperkeratosis. The main pathology is in and around hair follicles, and it is these hair follicles which show the widening of their mouths and the hyperkeratosis. Large horned cysts are seen deep down in the cutis, which are evidently due to the involvement of the pilo-sebaceous apparatus in this process, as such horny cysts are surrounded by remnants of the hair structures. While some of the hairs and their attached sebaceous glands seem free of any marked amount of follicular inflammation, even in here is hyperkeratoses and enlarging of the follicular opening. In the midcutis and deeper, there can be seen dense accumulations of inflammatory exudation around

remnants of hair bulbs and hair structures, consisting of leucocytes, large mononuclear cells, many histiocytes, and foreign body giant cells. There is also seen in the papillary and subpapillary bodies throughout the section, a moderate amount of inflammatory action consisting of large mononuclear types of cells, many fixed tissue cells, and, in places, eosinophiles. These are situated around small blood vessels and free in the tissues. Evidently a great deal of pigmentation has occurred since there are many chromatophores present and relatively little inflammatory reaction in the overlying epidermis. This would indicate to me that at the time the section was taken, the process of hyperpigmentation was at an end. More data about the pigment could be deduced if sections were stained with pyronine-methyl green after being treated with silver nitrate. Sweat glands do not seem to be involved.

H 80.—The serial sections make it easier to follow the process. Here too we have essentially the same pathology as H 32, with the main seat of reaction involving the pilo-sebaceous apparatus. The rest of the epidermis shows relatively little, except for some scaling without parakeratosis. Again we see the evident widening of the follicular openings and the formation of hyperkeratotic plugs. Here too are seen horned cysts deep down in the cutis; and, in the deeper portions of hair follicles both in and around it, there is a marked inflammatory reaction. An almost tuberculoid granulation tissue is seen consisting of dense accumulations of both foreign body and Langerhans type of giant cells. Between these giant cells are many histiocytes and lymphocytes, the histiocytes in many instances having the characteristics of epithelioid cells. In the serial sections it can be seen that these horned cysts situated in the middle cutis are extensions of the enlarged hyperkeratotic follicles in which the whole follicular apparatus has been replaced by a huge invaginated structure full of horny material which has pressed against the rest of the structure causing atrophy with the resultant formation of horned cysts. Also from the serial sections it is evident that the dense mass of foreign body granulation tissue reaction is situated in and around remnants of sebaceous glands and hair bulbs.

Interpretation.—The process is analogous to acne, in that we have plugging of the follicular openings, follicular and perifollicular inflammatory reactions, and a foreign body giant reaction which is often associated in acne with the escape of sebaceous gland contents into the surrounding tissues. It differs from acne in that the plugging of the follicular openings is due almost exclusively to a hyperkeratotic process which seems to include not only the mouth of the hair follicles, but also extends downwards following the invagination into the associated structures. In acne we ordinarily have a combination of follicular hyperkeratosis and excessive secretion of the sebaceous glands. The last seems to play a very little role in this process. There is no real comedo present, but more like the follicular hyperkeratosis seen in ordinary vitamin A deficiencies.

—Dr. Samuel M. Peck.

CHLORACNE FROM CUTTING OILS

H 80.—The section consists of an elongated tissue 23 mm. long and 4.0 mm. thick in its thickest portion. Grossly, it is seen to contain several cystic structures.

Microscopic.—The stratum corneum is hyperkeratotic and loose. The hyperkeratosis extends into the orifices of both sweat ducts and follicular openings. At varying depths are cystlike structures. One such structure opens onto the surface. Inside of a broad opening the epithelium becomes greatly thinned and consists almost entirely of stratum correum, much of which has become loosened and lies free within the cystlike structure. There is very little cellular reaction about the wall of the pseudo-cyst. No sebaceous gland cells are seen in the wall.

Throughout the remainder of the section are other cystlike structures with the same kind of thin epidermal lining and containing keratinized cells. In some places the cyst wall is lacking and, instead, pronounced infiltrate is present, consisting of round cells, many foreign body giant cells and some fibroblasts. Other areas present this type of infiltrate with little signs of a cystic structure save some keratinized cells. In still other areas, organization has progressed still further and the essential change is fibrosis.

A few hair follicles are seen containing small hairs. There is a round cell infiltrate about some of the sweat ducts and the glandular acini. No cystic change in the sweat structures could be seen.

Interpretation.—The essential change consists of hyperkeratosis and pseudocystic dilatation, evidently of follicular orifices. This change is identical to that seen in the so-called halowax acne.

—Dr. S. William Becker.

A typical case history is given below:

I have been employed by * * * since May 1940 as a gear grinder. I work 8 hours a day, 5 days a week. Since I have worked for * * * the only job I have held is that of a gear grinder. On this job I use a grinder all the time and I use oil constantly in this work. I don't know the analysis of this oil but the type of oil is being changed constantly and I therefore come in contact with different types of oil. The only parts of my body to come in direct contact with this grinding oil are my hands and forearms but other areas of my skin are exposed to the vapor from the grinding. On my machine I use a 14-inch grinding wheel and this wheel makes around 3,000 or 4,000 revolutions per minute. This wheel is covered with oil constantly and this causes a spray in the air at all times. In November of 1940 I noticed small pimples and red spots on both of my forearms so I reported to * * * Hospital for treatment. After 3 or 4 weeks' treatment the rash cleared up completely. The only areas of my body affected were my forearms. This rash did not return until April 1941 when it again developed on my forearms. After a few weeks' treatment it went away. In November 1941 rather good sized bumps began to appear on my face and forearms. These bumps started as whiteheads and blackheads and later they began to get inflamed. These bumps then became quite large and some of them became infected and contained pus. This condition was entirely different from the slight rash I had had previously on my forearms and I did not have the present condition until November 1941. The condition I have at present started on my face and forearms at about the same time and spread rather rapidly until it covered my entire face, parts of my forearms and upper arms, especially on the under side, and my stomach. I first reported this condition to * * * on January 27, 1942, and at that time my skin was in pretty bad condition. I have been treated by Dr. Barlow since the above date and since then the rash seems to be somewhat improved. This rash itches quite a lot and thus causes quite a bit of discomfort. I feel this condition is the result of the constant contact with the oil over a period of time. So far as I know, I did not have any cuts, abrasions, etc., that became infected and the condition started on several parts of my body at once and not at any one particular area. All the areas of my body affected by this rash were exposed directly to the oil except my stomach and I feel the oil must have soaked through my shirt to start the rash on my stomach. In addition to the exposure of the grinding oil, I am also exposed to varsol constantly. It is necessary for me to wash parts in varsol and this gets on my hands and arms. I also have to remove the varsol from the parts with an air hose and this creates a vapor or spray from the varsol. I had been working for * * * for about 18 months and was exposed to the oil and varsol constantly before the present skin condition developed.

SUMMARY

It was found that workers on cutting tools who are exposed to the mists of chlorinated cutting oils used for heavy cutting and grinding operations develop lesions on the face and other parts of the body. These lesions resemble chloracne both clinically and microscopically.

RECOMMENDATIONS

It is claimed that the oils containing organic chlorine compounds have some advantages over other oils in certain cutting operations. If this is so and they must be used, then heavy cutting operations where oil mist is given off should be vented in such a manner that the vapors are carried away and do not come in contact with the worker.[3]

Workers on such operations should be provided with clean work clothes daily and with sleeves and aprons made of a material impervious to oil.[4] They should be provided with a protective ointment of the type which forms a water-soluble, oil-repellent film for use on the face and neck, and showers after work should be compulsory and supervised.

The oil chemists of the plant should ascertain the ingredients of all cutting oils which are used and inform the safety director so that the workers may be adequately protected from those containing chlorine compounds.

The ordinary remedies for the treatment of acne vulgaris do but little good in chloracne. The treatment recommended is washing of the affected parts several times daily with a special industrial skin cleanser consisting of sulfonated castor oil, 98 parts, and Duponol W. A. Pure, 2 parts;[5] once or twice a week a number of cysts should be evacuated by incision or expression under antiseptic conditions.

LOCATION AND MOVEMENT OF PHYSICIANS, 1923 AND 1938 —TURNOVER AS A FACTOR AFFECTING STATE TOTALS[1]

By JOSEPH W. MOUNTIN, *Assistant Surgeon General*, ELLIOTT H. PENNELL, *Statistician*, and VIRGINIA NICOLAY, *United States Public Health Service*

General observations concerning the distribution and movement of physicians in the continental United States during the period 1923 to 1938 were presented in a previous report.[2] Although the physician-

[3] It was found that some cutting oils also contain as much as 5 percent carbon tetrachloride.

[4] Schwartz, Louis, Warren, Leon H., and Goldmann, Frederick H.: Clothing for protection against occupational skin irritants. Pub. Health Rep., 55: 1158 (June 28, 1940).

[5] Schwartz, Louis: A new industrial skin cleanser. Pub. Health Rep., 56: 1788 (Sept. 5, 1941).

[1] Assistance in the preparation of these materials was furnished by the personnel of Work Projects Administration Official Project No. 65-2-23-356.

[2] Mountin, Joseph W., Pennell, Elliott H., and Nicolay, Virginia: Location and movement of physicians 1923 and 1938—General observations. Pub. Health Rep., 57: 1363-1375 (1942).

population ratio for the country as a whole was essentially the same at the beginning as at the end of this interval (131 per 100,000 population), the data revealed a growing disparity in the extent to which populations in States with different characteristics shared in the physician total over the 15-year period. In 1938 residents of a large group of wealthy and highly urbanized States realized provisions for medical service, as expressed by numbers of physicians, which were twice as great as those in States ranking low in terms of income and urbanization. Inasmuch as the differences had greatly increased over the study period, the question naturally arises regarding the extent to which recruitment of new registrants and subsequent physician migration affect trends in States; also whether or not increments to the profession from either source were dependent upon conditions that might be ameliorated in the interest of fostering a more equable distribution of professional resources. For this reason it seems pertinent to present additional data focused on the degree to which physician migration and recruitment of new registrants contributed to this phenomenon, and the circumstances that were associated with the turnover in selected groups of States. Since the investigation covers the period from 1923 to 1938, the findings do not reflect the influence of the war situation as it has later developed. Their main value lies in a portrayal of change that occurs under the free play of social forces during a complete economic cycle.

As was described in the preliminary report, the location of individual physicians was traced through the several directories of the American Medical Association [3] published during the study period, and listings therein were construed to indicate active participation in medical practice. Those former registrants whose names were omitted from the 1938 register are classified as having discontinued active professional work and it is assumed that in most cases they had deceased; those newly registered represent, for the most part, recent graduates.

Of note is the finding that during the study period 52,000 physicians in the continental United States left the medical profession and more than 75,000 entered this field. In addition, there were nearly 6,000 who both entered and departed from the profession without being included in the totals for either the initial or terminal year. Thus approximately 133,000 had entered or were lost from the profession. Only 94,000 physicians were included throughout the 15-year period, and of these 13,000 made one or more changes in location which involved movement from one State to another. For an average group of 100 physicians in the 1923 directory, 56 were listed in the same State, 36 had left the profession, and 8 had moved to another State by 1938; meanwhile, 8 had moved to this State and 51 new registrants

[3] American Medical Directory, eighth, ninth, tenth, eleventh, twelfth, thirteenth, fourteenth, and fifteenth editions, 1923, 1925, 1927, 1929, 1931, 1934, 1936, and 1938. American Medical Association, Chicago.

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had entered the profession. The net effect of these changes reflected an increase of 15.9 percent in the total number of physicians over the period, an increase almost exactly proportional to the corresponding population increase.

Without doubt a turnover of this magnitude warrants an investigation into the influences effecting so notable an interchange, particularly with reference to States in which the provisions for care were greatly modified during the period. While the differences between the additions to and the subtractions from physician totals in States represent a measure of net change that occurred, such turnover may eventuate from varied action. Physicians whose names appeared in a 1938 State list will comprise those continuously listed therein throughout the 15-year period, those who had moved thereto from another State, and others who were registered some time after 1923 and were residing therein in 1938. On the other hand, physicians listed in a given State in 1923 may have maintained constant residence in that State, separated from the profession, or moved to another State by 1938. It is apparent, then, that the loss of physicians and the recruitment to replace losses in any given State may reflect not only the balance between decedents and new registrants over the period but also the effect of migration from or to that State.

Every loss through death or removal to a foreign country will indicate the subtraction of one physician from the total for the continental United States as well as from the State in which his name was last listed during the period, while a newly registered physician will represent, at the end of the period, an addition to both the national total and the number for that State in which he was listed. On the other hand, migration between States cannot alter the number of physicians for the United States as a whole because interstate movement would neither augment nor diminish this national total. In selected States, however, it is possible that the increments arising from immigration of physicians may exceed or fall short of the decrements resulting from emigration so that a net gain or loss is derived therefrom in State totals. The net effect of the turnover entailed in the several above-mentioned factors determines both the nature and amount of fluctuation in the number of physicians in a State over the study period.

For the purposes of this study, States have been classified in one of three basic groups: (A) States in which physician totals were greatly increased (20 percent or more) during the study period, (B) States in which physician totals were slightly increased (less than 20 percent) during the study period, and (C) States in which physician totals were decreased during the study period. There were 15, 13, and 21

States, respectively, in these three categories.[4] This arrangement groups States showing similar trends in physician-population ratios. In the first category all but three States gave evidence of more generous numbers of physicians per unit of population at the end than at the beginning of the study period, and in the three States constituting exceptions the rate of population increase was sufficiently high over the period to exceed the proportionate increase in physicians so that reduced ratios were recorded by the end of the period. In the intermediate group of States ratios failed to change greatly; only a single State showed more generous facilities at the terminal than at the

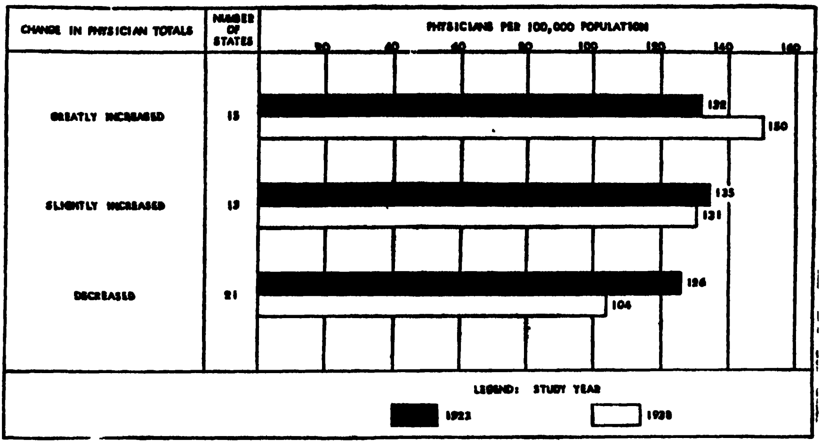

FIGURE 1.—Physicians per 100,000 population in 1923 and in 1938 for States wherein physician totals were greatly increased, slightly increased, or decreased over the period from 1923 to 1938.

initial year. In the third group, reduced physician totals were associated with declining physician-population ratios.

In 1923 the number of physicians per 100,000 population was not widely divergent between the three basic groups of States. Provisions for care in States comprising the third group were somewhat below the national average for that year, whereas slightly more generous numbers of physicians were manifest in the first and intermediate groups (fig. 1). During the period the ratio for the first group of States registered a considerable gain, for intermediate States a slight decline, and for the third group a substantial decrease.

The fraction of all physicians dropped from the profession was 36 percent for the country as a whole, and varied only between 34 for

[4] States included in the three basic groups are as follows: Group A: Arizona, California, Connecticut, Delaware, Florida, Maryland, Massachusetts, Michigan, Minnesota, New Jersey, New York, North Carolina, Rhode Island, Washington, and Wisconsin. Group B: Colorado, District of Columbia, Illinois, Louisiana, Nevada, New Mexico, Ohio, Oregon, Pennsylvania, Texas, Utah, Virginia, and West Virginia. Group C: Alabama, Arkansas, Georgia, Idaho, Indiana, Iowa, Kansas, Kentucky, Maine, Mississippi, Missouri, Montana, Nebraska, New Hampshire, North Dakota, Oklahoma, South Carolina, South Dakota, Tennessee, Vermont, and Wyoming.

States showing large physician increases to 38 in States realizing net losses in physician totals over the period. The highest percentage described States in which the total number of physicians had actually declined over the period. Further subtractions due to emigration to other States represented from 7 to 8 percent of the physicians listed in 1923. The net result of migration, however, contributed very little to the change. In States with the greatest gains, 10 physicians had emigrated from other States by 1938 for every 7 initially located therein who had moved to other States by the end of the study period. In intermediate States and in those showing decreased physician totals there was a small net loss due to migration; in both groups approxi-

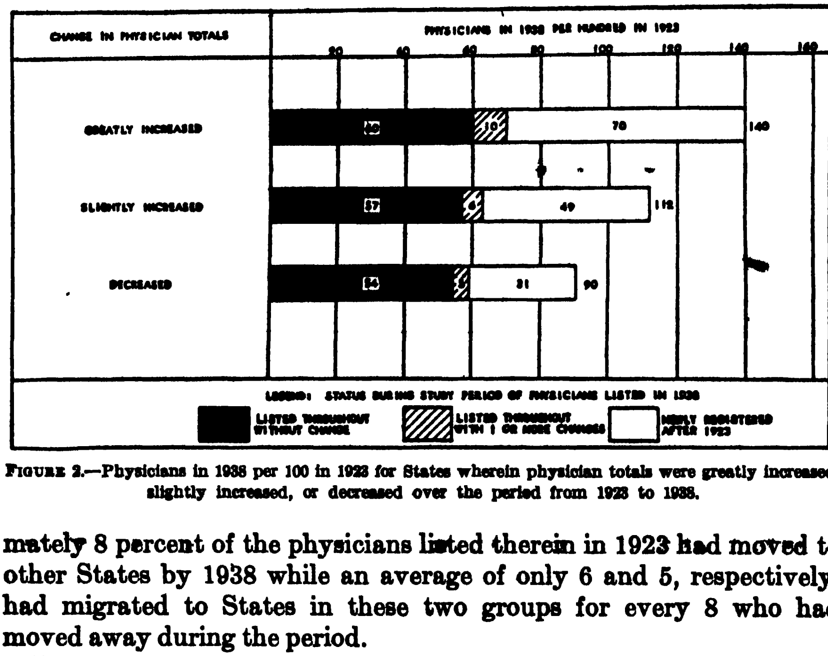

FIGURE 2.—Physicians in 1938 per 100 in 1923 for States wherein physician totals were greatly increased, slightly increased, or decreased over the period from 1923 to 1938.

mately 8 percent of the physicians listed therein in 1923 had moved to other States by 1938 while an average of only 6 and 5, respectively, had migrated to States in these two groups for every 8 who had moved away during the period.

There is evidence of a striking difference in one essential respect, namely, the number of new registrants settling in the States during the study interval (fig. 2). In States with largely increased numbers, 70 new registrants had established residence therein during the period for every 100 physicians in the State in 1923. In contrast, the corresponding addition of new registrants in States showing declines in physician totals was 31, a number less than one-half as large as that which prevailed in the former group. States in the intermediate group realized 49 new registrants for every 100 physicians in States at the beginning of the period. It would appear, then, that those States evincing greatly increased numbers of physicians gave evidence of such a great influx of young physicians that new registrants numeri-

FIGURE 1-A —Cyst of the sebaceous glands caused by chlorinated cutting oils similar to those caused by chlornaphthalenes and chlordiphenyls.

FIGURE 1 B —Chloracne from cutting oils showing extent of lesions

FIGURE 2.—Acne from chlornaphthalenes and chlordiphenyls (Halowax.)

FIGURE 3.—Mist of chlorinated cutting oil occurring in heavy gear grinding operations. Note oil droplets on machine surface in right lower corner.

FIGURE 4.—Biopsy section of chloracne from chlornaphthalenes and chlordiphenyls. (See text for description.)

FIGURE 5—Biopsy section of chloracne from chlorinated cutting oils (See text for description)

cally dominated the total in 1938. In States where the number of physicians had been reduced from 1923 to 1938, such additions were much smaller and the final total is predominantly comprised of those physicians who were listed in the profession throughout the study period.

In States in which new registrants make up a large fraction of the total physicians it is to be expected that the average age will be relatively low, and that physician reserves measured in terms of average expected future years of practice for physicians will greatly exceed those in areas where the physician group indicates smaller fractions of recent graduates. In a significant manner does the median age of physicians located in the three basic groups of States at the end of the study period demonstrate these differences. Where the largest gains occurred the median age was 43 years, where physicians increased to a lesser extent the median was 49 years, and in States where net losses in physician totals occurred the median was 53 years. Accordingly, it is evident that there was a spread of 10 years between the median ages for the three groups of States. Such a spread would indicate that those States in which the increment of new physicians was proportionately small are faced with important recruitment problems in the future if the level which even now exists is to be maintained.

In brief, the findings thus far presented reveal that in States with expanding physician totals the losses from the profession during the period represented 34 per 100 physicians in 1923, there was no significant change through migration, and 70 new registrants were located in these States in 1938 for every 100 physicians residing therein in 1923. The median age of physicians in these States was 43 years. At the other extreme, States with net decreases in physicians during the interval lost 38 from the profession and in addition realized a net loss of 3 physicians through migration, but obtained only 31 new registrants for every 100 physicians in 1923. In these States the median age of physicians in 1938 was 53 years. These large differences in the recruitment of young physicians and the resulting contrast in age distributions among the three groups of States suggest that unless methods are devised and employed to promote an increased acquisition of young physicians in States heretofore showing net losses, the disparities may become more pronounced in years to come. The physician-population ratios for these States not only were below those for other States, but the median age indicates that a high fraction of physicians was in the older age groups.

In the preliminary report of this series it was shown that highly urbanized and wealthy States shared to a much larger degree in the physician total at the onset of the study period than did other States, and the disparity between physician-population ratios became even

more accentuated by 1938. This suggests that the relative ability of populations in States to purchase needed medical care has an important bearing upon any steps which might be taken to stimulate a more equable distribution of physicians. There were, however, ample poor States and sufficient relatively wealthy ones in each basic group to make practicable comparisons for wealthy and poor States, thus isolating the influences other than wealth of States which contributed to the proportionate changes in physician totals over the period. In figure 3, States occupying the upper half of the array based on per capita income in 1930 [5] are referred to as wealthy, while

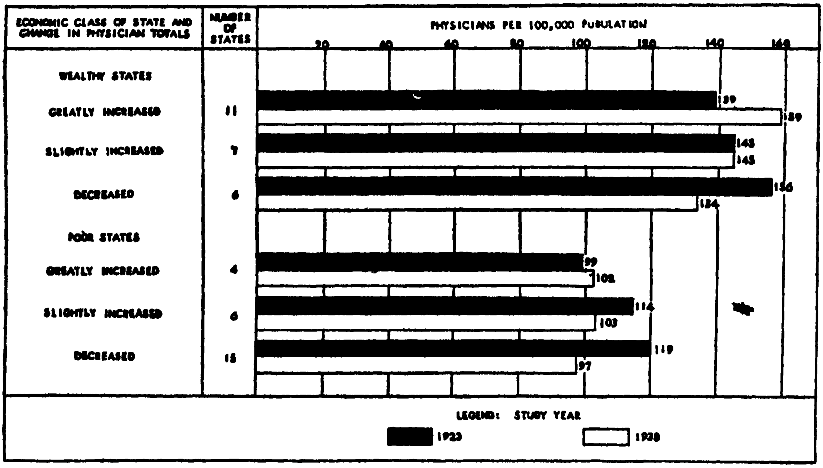

FIGURE 3.—Physicians per 100,000 population in 1923 and in 1938 for wealthy and poor States wherein physician totals were greatly increased, slightly increased, or decreased over the period from 1923 to 1938.

those below the median State are considered to be poor, although the use of these terms is intended to denote relative ability to purchase medical care rather than any precise definition of wealth.

At both the initial and terminal years of the study period the number of physicians per unit of population was much greater in wealthy than in poor States for each of the three basic groups. Where physician totals showed gains of 20 percent or more, the physician-population ratios increased from 139 to 159 per 100,000 population in wealthy States as contrasted with a slight increase from 99 to 102 in poor States. Where increases were less than 20 percent, the 1923 ratio of 145 for wealthy States showed practically no change over the period, whereas in poor States the ratio declined from 114 to 103. Where declining physician totals were recorded, less favorable ratios were found at the termination of the 15-year period in both wealthy and poor States; in the wealthy group the change from 156 to 134

[5] Classification of States based upon figures published by Frederick M. Cone, U. S. Department of Commerce, "Per capita income payments by States, 1929–40."

still reflected a less pronounced decline than did the change from 119 to 97 in poor States.

For both wealthy and poor States in a given basic group there was a marked similarity in the extent to which migrating physicians, physicians dropped from the profession, and new registrants contributed to the trends in physician totals; however, the pattern of trend described by these factors operated at a much lower level in the poorer States. The proportion of those physicians who were listed in 1923 but dropped from the profession by 1938 varied only slightly, the fraction in both wealthy and poor States being about one-third where gains in physician totals were large, 35 to 36 percent where

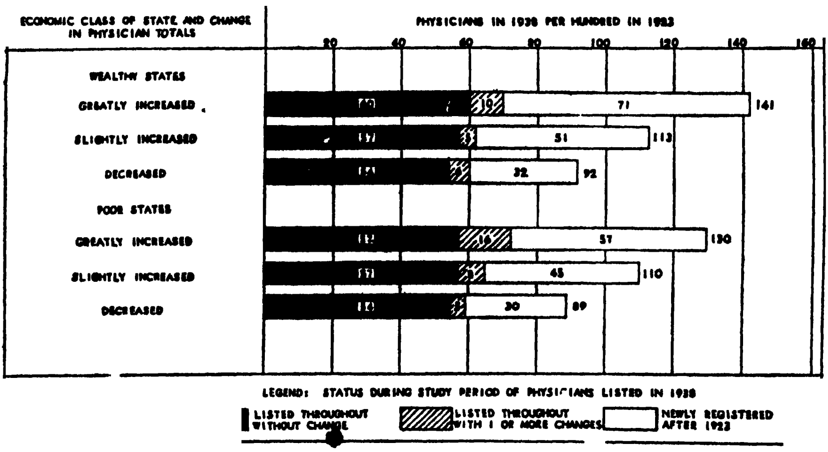

FIGURE 4 — Physicians in 1938 per 100 in 1923 for wealthy and poor States wherein physician totals were greatly increased, slightly increased, or decreased over the period from 1923 to 1938.

there were gains of less than 20 percent, and about 38 percent where the total was reduced over the period. The fraction of the physicians listed in 1923 who were listed in the same State in 1938 was likewise little altered by differences in State per capita income, nor was the net change through migration affected in any large degree.

Income differences did somewhat affect the number of new registrants in States in 1938 per 100 physicians who resided there in 1923 (fig. 4). Where physician totals showed large increases, 71 new registrants had been added in wealthy States as contrasted with 57 in poor States. In intermediate States the corresponding new registrants were 51 in wealthy and 45 in poor States, and wealthy States showing declining physician totals recruited only 32 new registrants per 100 physicians in 1923 as contrasted with 30 in poor States.

Thus, the findings presented reveal that States with high per capita incomes realized much more generous provisions for medical care than did those with low incomes. Nevertheless, there were among this group

certain States with fewer physicians at the end than at the beginning of the study period. Among the poor States, on the other hand, there were certain ones that realized increases in physicians over the period, and where these increases were large the ratio of physicians to population reflected more generous resources at the end than at the beginning of the study period. In both wealthy and poor States the nature and extent of change in physician totals largely reflected the degree to which the number of new registrants recruited during the period overbalanced or failed to equal losses from the profession.

The high degree to which large increases in physician totals appeared to be associated with the recruitment of new physicians suggests that

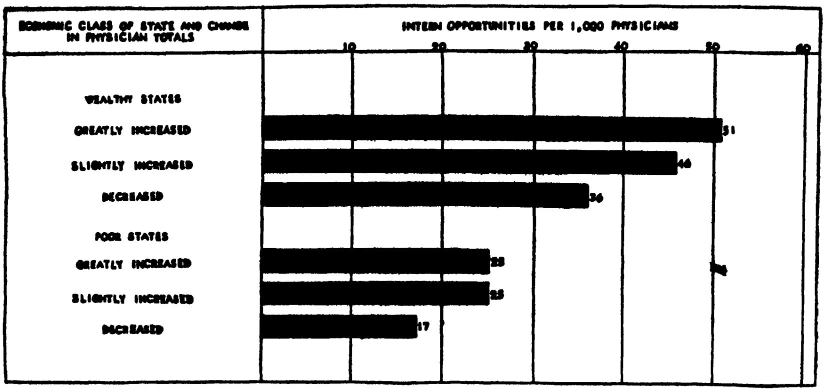

FIGURE 5.—Intern opportunities per 1,000 physicians in 1931 for wealthy and poor States wherein physician totals were greatly increased, slightly increased, or decreased over the period from 1923 to 1938

this phenomenon was perhaps related to the extent of physician training facilities in States. A count of the number of internships in States has been used as a measure of these training facilities. These data are readily available from the material published annually by the American Medical Association [6] regarding hospitals approved for the training of interns. The total opportunities for internships in 1931 (mid-period year) have been related to total physicians (in thousands) for the corresponding year as a simple measure of the extent of such facilities with respect to the problem of recruitment (fig. 5).

The findings clearly demonstrate that in both wealthy and poor States relatively extensive training opportunities were associated with increased physician totals over the period, whereas States showing decreasing physician totals provided more limited accommodations for the training of interns. Inasmuch as increases in physician totals largely reflected the balance of new registrants over the number of physicians lost from the profession, it seems likely that the extent of

[6] Statistics obtained from "Hospitals approved for internships" as presented by the Council on Medical Education and Hospitals of the American Medical Association. J Am Med. Assoc., 97: 629–637. (August 29, 1931).

training opportunities contributed very materially to differences in recruitment.

SUMMARY

The data presented indicate that, at the State level, trends in physician totals largely reflected the degree to which young physicians were recruited to replace losses from the profession. The net effect of subsequent migration of physicians contributed in only a very small way to the changes which occurred.

Where large gains in physicians were evident, the median age at the end of the period was approximately 10 years below that for States in which the physician total declined.

In every comparison, wealthy States realized more generous provisions for care than did poor States in the same basic group. Where increases occurred, whether in wealthy or poor States, the gain largely reflected the balance of new registrants over the losses from the profession during the study period.

States showing gains in physicians during the interval likewise realized a higher ratio of opportunities for the training of interns per 1,000 physicians in 1931 than did those where losses occurred. While the apparent influence of this factor failed to effect the equalization of facilities between wealthy and poor States, the findings reveal that a few poor States as well as numerous wealthy ones provided relatively generous opportunities for the training of interns and were able to attract sufficient new registrants to realize some gain not only in the total number of physicians but also in their physician-population ratios over the study period. On the other hand, a few wealthy as well as numerous poor States provided less generous training opportunities and especially these failed to attract sufficient new physicians to balance losses from the profession during the period 1923 to 1938.

A DISABILITY TABLE FOR URBAN WORKERS [1]

By HAROLD F. DORN, *United States Public Health Service*

The National Health Survey, conducted during the winter of 1935-36, obtained the first comprehensive data concerning the amount of disabling illness in the urban population of the United States. Prior to this survey the only existing information was based upon a number of limited investigations of illness in selected groups of the population and upon the records of a few sick benefit associations and group health and accident insurance plans. The National Health Survey, by means of a house-to-house canvass of over 700,000 households in urban

[1] From the Division of Public Health Methods, National Institute of Health. Assistance in the preparation of these data was provided by Work Projects Administration Official Project Nos. 712150-658/9090 and 765-23-3-10.

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communities and 37,000 households in rural areas, attempted to collect a variety of information concerning the amount of illness in the population, including all illnesses which kept a person from work, school, or other usual activity for 7 or more consecutive days during the 12 months immediately preceding the date of the canvass. It is the latter data, hereinafter called disabling illnesses, which are the subject of this paper.

A detailed description of the method and techniques of the survey is given elsewhere (*1*) and will not be repeated here except for a few definitions necessary for the correct interpretation of the subsequent analysis. By workers is meant (*a*) persons employed by private establishments and by governmental agencies, (*b*) unemployed persons engaged on work-relief programs, and (*c*) unemployed persons seeking work. Employment status was recorded as of the date of enumeration. Persons reported to have a chronic disease or permanent impairment which prevented them from working or seeking work were excluded from the working population.

Disability was defined as inability to work, attend school, care for home, or carry on other usual activities because of disease, accident, or physical or mental impairment. Disabling illnesses of 1 day or longer were recorded, provided the person was still unable to carry on his usual activities on the day of the visit. Otherwise, only illnesses disabling for 7 or more consecutive days were recorded. Fatal cases, hospital cases, and confinements were recorded irrespective of the duration.

Certain classes of persons were excluded from both the population and illness records. These included persons in penal institutions; residents of Army and Navy posts, orphanages, and homes for the aged; persons in hotels, rooming houses, and missions who had not been at their present abode for a month or longer. Persons who had been away from a given household for a month or longer on the date of the visit were excluded from the roster of that household because the informant could not be expected to be cognizant of their illnesses. In addition, there is evidence that a number of males between 20 and 45 years of age were not enumerated.

The illnesses discussed here include only those of urban workers 15–64 years of age. The onset must have been during the year previous to the date of enumeration and the duration of disability must have been 7 consecutive days or longer. The illness record of each person disabled on the day of the visit was modified in a manner to be described hereafter. Illnesses for which workmen's compensation was claimed have been excluded. Because of the serious under-enumeration, fatal cases have also been excluded.

A question may be raised concerning the reliability of disability data collected by means of a single house-to-house canvass. The

principal errors in information collected in this way may be grouped into those resulting from the underenumeration of illness (especially terminated illnesses of short duration and those terminating in death) and those resulting from misstatement of the duration of disability. The former is the more serious type of error since it affects both the slope and the ordinates of the disability curve; the latter type of error may affect the slope of the curve if the misstatement is very great, but usually this kind of error can be successfully corrected by proper grouping and graduation of the data.

Even though the illnesses recorded were restricted to those causing disability for 7 or more consecutive days unless the person was still disabled on the day of the visit, there is evidence of failure to report an appreciable number of cases of short duration. The particular methods used to compensate for underenumeration will be discussed later.

All illness data regardless of the manner of collection are subject to the fundamental limitation that even though everyone "knows" what an illness is no one has been able to define it in unequivocal terms which will have the same meaning under all circumstances. Few, if any, persons are biologically perfect or have a body which, physiologically, functions perfectly for long periods of time. But when shall any malfunctioning be termed an illness? Since illnesses result from conditions which may be largely, if not entirely, subjective as well as from obvious objective factors, in actual practice an illness exists when the person affected thinks that it does. Moreover, factors other than the mere presence of an ailment frequently influence a person's decision as to whether disability does or does not exist. For example, workers who receive sick leave with full pay would be expected to report more disabling illnesses than workers whose wages are lost by absence from work.

Even the number of "permanently disabled" persons is altered by conditions other than the presence of disability. One obvious factor is the extent of vocational rehabilitation. Another factor is the necessity for earning a living. A recent report of the Department of Health of Scotland (*2*) reveals that the number of chronic cases applying for sick benefits tends to fluctuate directly with the amount of unemployment. It should not be inferred from these statements that disability is a mere figment of the imagination. There are illnesses which disable regardless of the economic condition or attitude of the person affected. But in addition to these illnesses there are others which may or may not be considered as disabling, depending upon circumstances other than the fact of illness itself.

It is implicit in the discussion which follows that a given population group whose characteristics remain relatively fixed and which is subject to stable environmental influences will give rise to approximately the same amount of disability each year. Moreover, the number of

cases of disability which arise will form a smooth frequency curve when classed by duration; this curve, which can be plotted when the necessary parameters have been estimated, will be spoken of as the distribution curve of disability.

If the illnesses existing in a population during an arbitrary interval of time which is shorter than the duration of the longest case of illness are recorded, four classes of cases will occur. First, there will be cases with onset prior to the beginning of the period of observation and which terminate during the period. Second, there will be cases with onset prior to the beginning of the period and which are still disabled at the end of the period. Such cases are essentially permanently disabled if the period of observation is sufficiently long. Third, there will be cases with onset within the period and with termination before the end of the period. Fourth, there will be cases with onset within the period but which are still disabled at the end of the period.

No one group of these cases will give a correct representation of the distribution curve of disability. The first, second, and fourth will include a disproportionate number of cases of long duration while the third will include relatively too many cases of short duration. For example, the report of the Scottish health insurance system for 1936–37 (*2*) showed that while the unrecovered cases were only 6.4 percent of the total number of cases arising during the year, they contributed 21.3 percent of the total days of disability. If the true distribution of cases by duration is to be established, some procedure for combining these four types of cases is necessary.

Since this method of collecting data will not yield complete information concerning cases with duration longer than the period of observation, in this case 12 months, such cases have been omitted in the following discussion. The cases with onset prior to the beginning of the period of observation but which terminated during the period have also been eliminated since it is apparent that the correct distribution curve will be given by the cases arising within the period, provided that those which terminate and those which are still disabled are properly combined.

An additional reason for excluding both types of cases with onset prior to the beginning of the period of observation arises from the fact that the purpose of this analysis is to determine the incidence and not the prevalence of disabling illness. The incidence rate must be based upon cases developing during the period of observation and must exclude cases existing at the beginning of the period.

The distributions by duration of the two types of cases arising during the period of observation should not be added because the recorded duration of the unrecovered cases is less than the true but unknown duration which would be obtained by following the cases till completion. The method of combining the cases used here is based upon two

assumptions: first, that the population is stationary, i. e., fixed in number and composition, and, second, that there is a fixed pattern of illness duration which recurs uniformly with time. If desired, the second assumption could be modified to take account of the seasonal variation in illness but such modification did not seem necessary.

The period of observation covered by the survey was 1 year and the smallest unit of time for recording the duration of an illness was 1 day. In the absence of any enumerators' instructions concerning this particular point, it was decided to assume that illnesses existing on the day of the visit were recorded as being ill for the complete day. Theoretically this procedure would record as unrecovered all cases terminating on the day of the visit.

Since a fixed pattern of illness by duration is assumed to arise uniformly with time, if all cases arising during an arbitrary period of observation of N units of time, in this case 365 days, could be followed to termination, the number of cases of each duration would be N times the assumed distribution curve of duration. In other words, the cases arising during any given day if followed to completion are assumed to be distributed by duration according to the distribution curve of disability characteristic of the population. Now consider the cases arising during the period. The exact duration of all cases which recover will be known; the number of such cases is given in column 2 of table 1. All cases of duration equal to the unit of time, i. e., 1 day, will recover except those ill on the day of enumeration. Consequently there will be $(N-1)F_1$ recovered cases with duration equal to 1 day. The frequency of cases of other durations is obtained in a similar manner.

Now consider the cases still disabled on the day of enumeration. The frequency of unrecovered cases by attained duration is given in column 3 of table 1, and is computed in a manner similar to that of the recovered cases. For example, since the cases arising on the last day of the period of observation, that is, those with an attained duration of 1 day, are assumed to be representative of the distribution curve of disability of the group, they will include cases of each duration. Cases with an attained duration of 2 days will include those arising during the day prior to the day of the visit and will include cases of all durations of 2 or more days. Column 4 contains the first differences of the frequencies in column 3, and column 5 is the product of each first difference by the corresponding duration. The sum of the frequencies in columns 2 and 5 yields the desired distribution of cases by completed duration and is entered in column 6.

If the durations are tabulated in class intervals the above procedure must be modified when dealing with the unrecovered cases. For illustrative purposes it will be assumed that the data are grouped in

intervals of five units of time but this is quite arbitrary for the groups need not be of equal length.

Table 1.—*Number of cases of illness by duration and stage of recovery arising during an arbitrary time interval of N units of time*

Duration D_i	Recovered cases	Unrecovered cases			All cases
	Frequency F_i	Total	First difference Δ	$D_i\Delta$	Recovered cases plus $D_i\Delta$
(1)	(2)	(3)	(4)	(5)	(6)
1	$(N-1)F_1$	$\sum_1^N F_i$	F_1	F_1	NF_1
2	$(N-2)F_2$	$\sum_2^N F_i$	F_2	$2F_2$	NF_2
.	.		.	.	.
i	$(N-i)F_i$	$\sum_i^N F_i$	F_i	iF_i	NF_i
.	.	.	.		
$N-1$	F_{N-1}	$F_{N-1}+F_N$	F_{N-1}	$(N-1)F_{N-1}$	NF_{N-1}
N	O	F_N	F_N	NF_N	NF_N

The values of F_i represent the unknown curve of the distribution of illness by duration and must subsequently be determined from the data

Let $f_i=\sum_i^N F_i$, that is, the frequency of unrecovered cases of the i^{th} duration as shown in table 1, column 3. If the data in table 1 are grouped into 5-day groups the new table would start as follows:

Duration	Frequency of cases unrecovered on the day of the visit	Frequency when terminated
(1)	(2)	(3)
1–5	$f_1+\ldots+f_5=S_1$	$1f_1+f_2+f_3+f_4+f_5-5f_6$
6–10	$f_6+\ldots+f_{10}=S_2$	$6f_6+f_7+f_8+f_9+f_{10}-10f_{11}$.

The total frequency of unrecovered cases of the j^{th} class interval, S_j, is known even though the individual components are not. The problem is to obtain the frequency of completed cases shown in column 3 above. For the second group, 6–10, the frequency of completed cases is given by $S_2+5f_6-10f_{11}$ and in general if,

L_j=upper limit of the j^{th} class interval

S_j=frequency of observed cases in the j^{th} class interval

f_j=frequency of lower limit of the j^{th} class interval

the number of recovered cases$=S_j+L_{j-1}f_j-L_jf_{j+1}$.

For the first class interval, the number of recovered cases is $S_1 - L_1 f_2$. For the last class interval, the number of recovered cases is $S_k + L_{k-1} f_k$.

The only unknown quantity in these expressions is the frequency of the shortest duration in each class interval. This can be estimated in any convenient manner. A simple method would be to plot the cumulative distribution of the frequencies in the class intervals and read the desired frequency from the graph. Otherwise some interpolation formula could be used, or a curve could be fitted to the data.

After the unrecovered cases had been redistributed by duration as described above and combined with the recovered cases, the next task was to express the results in the form of a disability table. This task was somewhat complicated by the condensed form in which the data were tabulated. The class intervals shown in table 2 were chosen at the time of coding because of the tendency to report durations in terms of weeks and months.

It will be noticed that the distribution curve by duration is a reversed J shape with a large proportion of the area under the curve concentrated over a relatively short range of durations at the beginning of the curve. Various methods of subtabulating the data were tried, none of which proved especially satisfactory. Supposedly, a Pearson type I curve could be used but the higher moments calculated from a distribution of this nature are exceedingly unreliable and, furthermore, the labor of computing the subareas of the curve, providing a satisfactory fit could be obtained, is so excessive as to render this procedure impractical. Moreover, it seemed desirable to use a less broad grouping of the data.

TABLE 2.—*Number of cases of nonfatal disabling illness among urban workers aged 15-64 years, National Health Survey, 1935-36*

Sex	Duration in days										
	7-10	11-17	18-24	25-44	45-74	75-99	100-134	135-224	225-344	345-365[a]	Total
Male	14,688	11,830	6,878	9,721	5,278	2,273	1,697	1,886	1,063	2,241	57,555
Female	7,103	6,324	4,099	5,605	2,925	1,134	819	859	438	839	30,145

[a] Due to an oversight in the redistribution of unrecovered cases by duration, the cases placed in this group were in reality of 345 and more days duration.

The respective populations were 705,660 males and 265,960 females, 90.2 percent of the males and 84.2 percent of the females were white.

The frequencies were cumulated in a more-than distribution in order to concentrate the data at isolated points, and the resulting distribution was plotted on double logarithmic paper. This had the effect of stretching the original distribution so that it departed only slightly from a straight line over any short section of the curve. A smooth curve was then passed through the points by means of a flexible ruler; frequencies were read from the curve in 3-day intervals for the first

52 days and in 21-day intervals thereafter. Decumulation of these frequencies resulted in a distribution of cases by duration such that the sum of the frequencies up to any point corresponding to one of the class interval boundaries of the original distribution was equal to the corresponding sum of the original frequencies up to that point. Thus the data were subdivided without essentially altering the general shape of the original distribution. Both the 3-day and the 21-day group frequencies were subdivided to thirds by a suitable interpolation formula.[2] The result was a distribution of cases by duration by 1-day intervals up to 28 days and by weekly intervals thereafter.

When these data were plotted on double logarithmic paper it was found that the points could be approximated by a straight line except at the two ends of the distribution where the points fell definitely below such a line. The deviation at the long durations is to be expected because of the exclusion from the population at risk of persons in institutions (persons only temporarily in hospitals were not excluded) and persons who were chronically disabled. It is possible that the exclusion of fatal cases also may have unduly affected the number of long duration cases. The deviation at the other end of the curve was noticeable at about 28 to 30 days' duration and became progressively greater as the durations became shorter. It seemed evident that this was the result of underreporting of cases of illness of less than about 4 weeks' duration.

Because of the evident bias in the data for the short and the extremely long durations it was decided to determine the parameters of the frequency curve of duration of illness from the number of cases between 28 and 189 days, inclusive. The upper limit of 189 days was chosen because many disability benefit plans terminate on or before the twenty-sixth week, which, with a 7-day waiting period, makes 189 days.

In order to obtain a complete disability curve, it was decided to fit a frequency function to the observed data lying between 28 and 189 days and then extrapolate this function backward to the first day and forward as far as durations of 1 year. It is not claimed that the resulting disability curve is an accurate representation of the unknown basic curve for this population. There is no way of either proving or disproving such a claim without an accurate and complete determination of the number of cases of disabling illness by some independent method. It is merely asserted that the curve determined in the above manner is closer to the unknown basic curve over the entire range of durations from 1 day to 1 year than are the original data as collected in the survey. Since the basic curve is a reversed J shape the largest differences between it and the curve determined in the above manner would be at the short durations.

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[2] The author is indebted to Dr. Max Sasuly for developing the interpolation formula used in the subtabulation.

The accurate representation of a J-shaped distribution by a frequency curve presents a number of difficulties when the frequencies are given in class intervals. The usual procedure of computing the arithmetic mean of the frequency for each class interval and fitting the curve to these values, using the midpoint of the interval as the value of the independent variable, is not especially satisfactory. Moreover, some quadrature formula must usually be used to determine the areas after the parameters of the curve have been determined since mid-ordinates are only roughly approximate to areas.

It was decided to fit a curve to the frequencies expressed in weekly class intervals in such a way that the sum of the square of the difference between the area under the curve between two points and the area of the corresponding rectangle of frequency would be a minimum.[3] If x_{i-1} and x_i are the lower and upper limits of any class interval and $y_{i-\frac{1}{2}}$ is the ordinate at the midpoint, $x_{i-\frac{1}{2}}$, this is equivalent to minimizing

$$\sum_{i=1}^{n}\left\{(x_i-x_{i-1})\, y_{i-\frac{1}{2}}-\int_{x_{i-1}}^{x_i} f(x)\, dx\right\}^2$$

The curve chosen was $f(x)=ax^b$ where b has only negative values. Actually a curve of the form $\frac{a}{c+x^b}$ would have been preferable since the former becomes infinite when x is zero and b is negative. However, there is no simple way of evaluating the integral of the latter curve except for special values of b so that it could not be used.

Since $f(x)$ is not linear in its parameters the integral was evaluated and the result expanded in a Taylor series about preliminary values of a and b. The linear terms of this expansion were inserted in the above expression and the necessary equations for a minimum evaluated. A disability table prepared in this way is presented in table 3.

Exclusive of disability on the day of onset of illness the number of days of disability from nonfatal illness per person per annum was nearly 60 percent greater for female than for male workers: 6.3 days as compared with 4.0 days (fig. 1). The greater amount of illness reported for females as compared with males is in agreement with the results of other studies of morbidity. Another way of expressing the difference in morbidity is to consider the average number of claims existing on a given date under an insurance plan paying benefits beginning with the second day of disability and terminating at the end of the three hundred sixty-fourth day. The average number of claims per 100,000 population would be 1,723 for females and 1,096 for males.

It will be noted that the greater amount of disability among female

[3] The author is indebted to Dr W Edwards Deming for calling his attention to "Note on interpolation," by Jan K Wisniewski, J Am Statistical Assoc, 25: 203 (1930), where this procedure is suggested

workers results from a relatively larger number of cases of short duration (columns 2 and 3). However, this excess amount of disability among female workers decreases fairly rapidly so that at the longer durations the male and female rates are practically equal. By the end of the twenty-sixth week the case rate among females is only 17 percent greater than the corresponding rate among males, and by the forty-fourth week there is essentially no difference in the rates.

It will be instructive to compare the amount of disability reported

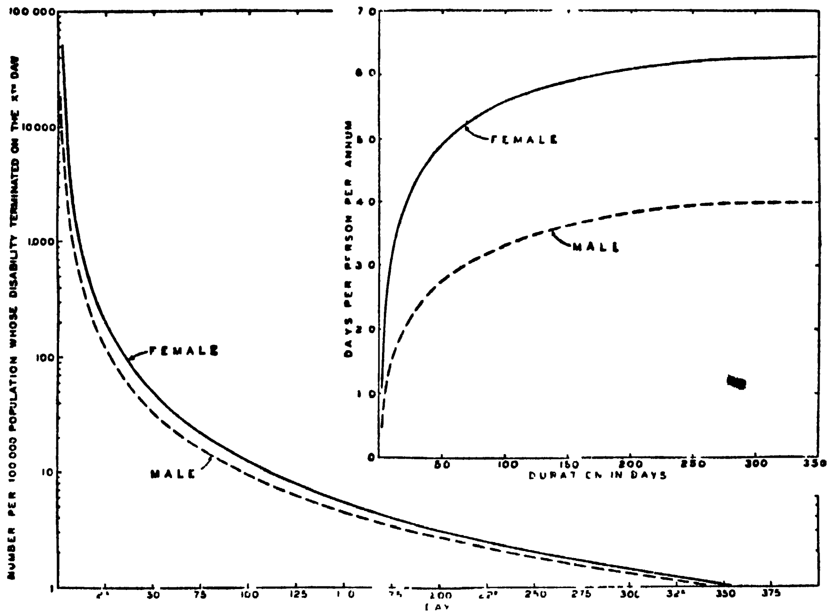

FIGURE 1.—Number of cases of nonfatal illness per 100,000 population with disability terminating on the x^{th} day and the average number of days of disability per person per annum, male and female, National Health Survey, 1935–36.

for this population with that recorded by various sick benefit and group sickness insurance plans. Before doing so, however, it is well to indicate some factors affecting disability data obtained by various methods.

As was pointed out above, it is, for all practical purposes, impossible to define either disabling or nondisabling illness in such a way that the number of cases reported by a given group of the population is not influenced by social and economic conditions. In preparing the disability data presented in table 3 it was assumed that the fundamental

curve of the incidence of disabling illness by duration was a uniformly decreasing function. In addition to theoretical reasons for believing this to be true there also are illness records which support this belief. But the particular circumstances under which any given sick benefit plan is carried on may materially alter the shape of the disability curve, especially at the short durations.

The method of selecting employees by the industries covered by the plan will influence the amount of disability. This is especially true if physical examinations are required or if persons with certain diseases are excluded. Moreover, the nature of the work and the working conditions also affect illness rates by selection of workers of particular physical types and by increasing the incidence of selected causes of illness. The shape of the disability curve at the short durations is determined to a large extent by the amount of respiratory diseases. The incidence of such diseases not only fluctuates from year to year but is also greater in some occupations than in others. Moreover, the attitude toward acute respiratory infection is changing and it is becoming more common for persons with such ailments to remain at home. Since the shape of the disability curve for individual diseases varies widely, factors which tend to increase the incidence of particular diseases will alter the general shape of the curve for all illnesses combined.

The relative burden of the cost of illness and the loss of wages affects the amount of disability, especially at the short durations. There is some evidence that the amount of disability is also affected by whether or not compensation is given (*3*). The results of insurance company group morbidity investigations indicate that the relative number of claims for short duration disability is influenced by the length of the waiting period and that this influence persists for durations of as much as 2 to 3 weeks after the end of the waiting period (*4*). In addition to these and other factors, variations in age, sex, and similar characteristics also affect disability rates.

Furthermore, it is important to bear in mind the special limitations of the disability data presented in table 3. The amount of disability has been decreased by the exclusion of data for persons permanently disabled, persons in institutions, workmen's compensation cases, and cases of fatal illness The extent to which underreporting of disability has been corrected by the procedure used in preparing the disability table is also unknown.

TABLE 3.—*Disability table for nonfatal illnesses among urban workers aged 15–64 years, by sex, National Health Survey, 1935–36*

Duration in days x_{i-1}—x_i	Number per 100,000 whose disability ended during duration x		Number per 100,000 with disability of duration x or more		Number of days of disability per person per annum from disability of duration x or less		Average prevalence of disabled cases of duration x or less per 100,000 population	
	Male	Female	Male	Female	Male	Female	Male	Female
1	2	3	4	5	6	7	8	9
1-2	18,811	52,659	44,097	107,229	0.44	1.07	121	294
2-3	7,061	17,858	25,286	54,570	.69	1.62	189	443
3-4	3,799	9,025	18,225	36,712	.88	1.99	241	544
4-5	2,405	5,456	14,426	27,687	1.02	2.26	279	620
5-6	1,672	3,660	12,021	22,231	1.14	2.48	312	681
6-7	1,237	2,628	10,349	18,571	1.24	2.67	340	732
7-8	956	1,979	9,112	15,943	1.34	2.83	367	775
8-9	763	1,545	8,156	13,964	1.42	2.97	389	813
9-10	625	1,240	7,398	12,419	1.49	3.09	408	847
10-11	522	1,018	6,768	11,179	1.56	3.21	427	878
11-12	443	851	6,246	10,161	1.62	3.31	444	906
12-13	382	722	5,803	9,310	1.68	3.40	460	931
13-14	332	620	5,421	8,588	1.73	3.49	474	955
14-15	292	520	5,089	7,968	1.78	3.57	488	977
15-16	259	490	4,797	7,448	1.83	3.64	501	997
16-17	232	417	4,538	6,958	1.88	3.71	515	1,016
17-18	209	371	4,306	6,541	1.92	3.77	526	1,034
18-19	189	333	4,097	6,170	1.96	3.84	537	1,051
19-20	172	300	3,908	5,837	2.00	3.89	548	1,067
20-21	157	272	3,736	5,537	2.04	3.95	559	1,082
21-22	145	248	3,579	5,265	2.07	4.00	567	1,097
22-23	133	226	3,434	5,017	2.11	4.05	578	1,110
23-24	123	208	3,301	4,791	2.14	4.10	586	1,124
24-25	114	191	3,178	4,583	2.17	4.15	595	1,136
25-26	106	177	3,064	4,392	2.20	4.19	603	1,148
26-27	99	164	2,958	4,215	2.23	4.23	611	1,160
27-28	93	153	2,859	4,051	2.26	4.27	619	1,171
28-35	514	826	2,766	3,898	2.46	4.52	674	1,238
35-42	358	554	2,252	3,072	2.61	4.71	715	1,291
42-49	265	398	1,894	2,518	2.73	4.88	748	1,336
49-56	204	300	1,629	2,120	2.84	5.01	778	1,373
56-63	163	234	1,425	1,820	2.93	5.13	803	1,406
63-70	134	188	1,262	1,586	3.02	5.24	827	1,435
70-77	112	154	1,128	1,398	3.09	5.33	847	1,460
77-84	95	129	1,016	1,244	3.16	5.41	866	1,483
84-91	82	109	921	1,115	3.22	5.49	882	1,504
91-98	71	94	839	1,066	3.28	5.56	899	1,523
98-105	63	82	768	912	3.36	5.62	921	1,539
105-112	56	71	705	830	3.41	5.67	934	1,555
112-119	50	63	649	759	3.45	5.72	945	1,568
119-126	45	56	599	696	3.49	5.77	956	1,581
126-133	40	51	554	640	3.53	5.81	967	1,594
133-140	37	45	514	589	3.56	5.85	975	1,604
140-147	34	41	477	544	3.60	5.89	986	1,614
147-154	31	37	443	503	3.62	5.92	992	1,623
154-161	28	34	412	466	3.65	5.96	1,000	1,632
161-168	26	31	384	432	3.68	5.99	1,008	1,640
168-175	24	29	358	401	3.70	6.01	1,014	1,647
175-182	23	27	334	372	3.73	6.04	1,022	1,654
182-189	21	25	311	345	3.75	6.06	1,027	1,661
189-196	20	23	290	320	3.77	6.08	1,044	1,666
196-203	19	21	270	297	3.79	6.10	1,049	1,672
203-231	64	74	251	276	3.85	6.17	1,066	1,690
231-259	52	58	187	202	3.90	6.22	1,079	1,703
259-287	43	46	135	144	3.93	6.25	1,088	1,713
287-315	35	38	92	98	3.95	6.27	1,093	1,719
315-343	31	33	57	60	3.96	6.29	1,096	1,722
343-371	26	27	26	27	3.96	6.29	1,096	1,723

The duration intervals are the limits of integration used in calculating the number of cases upon which the rates are based, the interval 1-2 stands for the second day; the interval 28–35 stands for the fifth week. In column 2, the figures should be interpreted as follows 18,811 per 100,000 male population had a disability which ended on the second day, 514 per 100,000 male population had a disabling illness which ended during the fifth week. In column 4, 44,097 per 100,000 male population were disabled on the second day or longer; 2,766 per 100,000 male population were disabled on the twenty-ninth day or longer, i e., 4 or more weeks. In other words, the disability terminated during the fifth week or later In column 6, the amount of disability per person per annum resulting from all disability existing during the fifth week or of shorter duration was 2.46 days.

In tables 4 and 5 the number of days of certain specified durations of disability per person per annum are shown for a number of insured groups. For male workers, the amount of disability reported by the industrial sick benefit organizations is about 10 to 20 percent greater than that reported in the Health Survey. The experience of the Aetna Life and intercompany investigations, however, shows rates of disability from one and one-half to two times those for the Health Survey. The relative difference in amount of disability is even greater for females than for males. In addition to the factors affecting disability rates mentioned above, it should be remembered that most of the workers included in the Health Survey received no compensation for disability whereas the workers covered by the insurance plans did.

TABLE 4.—*The number of days of disability per person per annum reported by selected investigations, male workers only*

Period of disability [a]	Health Survey	Intercompany investigations [b]	Aetna Life [c]	Industrial sick benefit organizations [d]	Ratio to Health Survey		
					Intercompany investigations	Aetna Life	Industrial sick benefit organizations
4th day–13 weeks	2.6	4.2	4.1		1.62	1.58	
4th day–26 weeks	3.1	5.7	4.8		1.84	1.55	
4th day–52 weeks	3.3	6.6	5.4		2.00	1.64	
8th day–13 weeks	2.0	3.0	3.[illegible]	2.3	1.50	1.75	1.15
8th day–26 weeks	2.5	4.4	4.2	2.8	1.76	1.68	1.12
8th day–52 weeks	2.7	5.3	4.7	3.3	1.96	1.74	1.22

[a] The period of disability continued 13, 26, and 52 weeks respectively, after the 4th and 8th day.
[b] Group accident and sickness experience of 6 private insurance companies, 1931–35, white males in standard industries. Includes disabling sickness and nonoccupational accidents. See reference 4.
[c] Includes disabling sickness and nonoccupational accidents of white males 1920–25. See reference 5.
[d] Includes disability from sickness and nonindustrial injuries among male workers (mostly whites) in selected industries, 1935–37. See reference 6.

It is estimated that the average amount of disability per person per annum from cases of illness which terminate in death is about 0.35 to 0.40 day for male workers when the period of disability extends for 52 weeks beginning with the eighth day. If this amount is added to the number of days from nonfatal illness in table 4, the amount of disability per male worker reported in the Health Survey is only slightly less than that reported by the industrial sick benefit organizations. No estimate was made of the amount of disability from fatal cases of illness for females but since mortality rates, as a rule, are lower among females than among males the average number of days per annum must be less than that for males. Adding even 0.40 of a day to the figures in table 5 leaves the total days for fatal and nonfatal cases combined for female workers less for the Health Survey than for the industrial sick benefit organizations.

TABLE 5.—*The number of days of disability per person per annum reported by selected investigations, female workers only*

Period of disability [a]	Health Survey	Metropolitan Life [b]	Industrial sick benefit organizations	Aetna Life	Ratio to Health Survey: Metropolitan Life	Ratio to Health Survey: Industrial sick benefit organizations	Ratio to Health Survey: Aetna Life
8th day–13 weeks	2 9	7 0	4 6	6 7	2.41	1.59	2.31
8th day–26 weeks	3 4	8 9	5 2	7 8	2 62	1 53	2.29
8th day–52 weeks	3 6		5 6			1.56	

[a] See footnote a to table 4

[b] Includes disability from sickness and nonindustrial accidents among white female workers, 1923–28. See reference 7.

Because of the exclusion of certain types of cases described above, and underreporting of cases of short durations, the amount of disability per person reported in the Health Survey is evidently less than that of persons covered by sickness insurance plans. Nevertheless, it was decided to present the results of the Health Survey, especially since these make available for the first time disability data for workers classified by income, occupation, and employment status. Even though the absolute amount of disability may be too low there is no reason to believe that the relative variation by income and occupational class is seriously in error. Disability tables for workers classed by employment status, income, occupation, and age are being prepared and will be subsequently published. Some results for certain classes of workers are presented in table 6.

TABLE 6.—*The number of days of disability per person per annum from nonfatal illnesses for selected classes of workers, National Health Survey, 1935–36*

Class of worker: Sex	Age	Income	Days of disability
Males	15–64	Total employed	3.6
Males	15–64	Total unemployed	5.4
Males	15–64	$3,000 and over	3 9
Males	15–64	Under $3,000	4.0
Males	15–64	Under $2,000	4.0
Males	15 24	Total	3.1
Males	55–64	Total	5.8
Males	15–64	Under $3,000 clerical and manual	4.0
Females	15–64	Under $3,000 clerical and manual	5.5
Females	15–64	Total employed	5.4
Females	15 64	Total unemployed	8.4

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BIOLOGICAL PRODUCTS

Establishments Licensed for the Propagation and Sale of Viruses, Serums, Toxins, and Analogous Products

There is presented herewith a list of the establishments holding licenses issued by the Federal Security Agency in accordance with the act of Congress approved July 1, 1902, entitled "An act to regulate the sale of viruses, serums, toxins, and analogous products in the District of Columbia, to regulate interstate traffic in said articles, and for other purposes."

The licenses granted to these establishments for the products mentioned do not imply an endorsement of the claims made by the manufacturers for their respective preparations. The granting of a license means that inspection of the establishment concerned and laboratory examinations of samples of its products are made regularly to insure the observance of safe methods of manufacture, to ascertain freedom from contamination, and to determine the potency or safety, or both, of botulism antitoxin; diphtheria antitoxin; dysentery antitoxin, Shiga; histolyticus antitoxin; odematiens antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; sordellii antitoxin; staphylococcus antitoxin; tetanus antitoxin; vibrion septique antitoxin; antidysenteric serum; antimeningococcic serum; antipneumococcic serum; anti-Rocky Mountain spotted fever serum; meningococcus typing serum; pneumococcus typing serum; bacterial vaccines made from cholera vibrio, plague bacillus and typhoid bacillus; diphtheria toxin-antitoxin mixture, diphtheria toxoid, tetanus toxoid, diphtheria toxin for Schick test, scarlet fever streptococcus toxin for Dick test, scarlet fever streptococcus toxin for immunization; equine encephalomyelitis vaccine; Rocky Mountain spotted fever vaccine; smallpox vaccine; typhus vaccine, and the arsphenamines and other organic arsenicals, the only products for which potency standards or tests have been established.

The enumeration of the products is as follows: Serums are placed

toxin for immunization; allergenic extracts (including pollens); poison ivy extract; poison oak extract; arsphenamine, neoarsphenamine, phenarsine hydrochloride; sulfarsphenamine; tryparsamide.

Eli Lilly & Co., Indianapolis, Ind.—License No. 56:

Diphtheria antitoxin; erysipelas streptococcus antitoxin; perfringens antitoxin; tetanus antitoxin; vibrion septique antitoxin; antimeningococcic serum; antistreptococcic serum; hemostatic serum (Lilly); heterophile antibody; normal human plasma; normal serum albumin; normal horse serum; rabies vaccine (modified Harris); smallpox vaccine; typhus vaccine; tuberculin old; bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, plague bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial vaccine made from partially autolized pneumococci; diphtheria toxin-antitoxin mixture; diphtheria toxoid; tetanus toxoid; diphtheria toxin for Schick test; bacterial antigens made from acne bacillus, colon bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, and streptococcus; fungus antigens; trichinella extract.

Gilliland Laboratories, Marietta, Pa.—License No. 63:

Diphtheria antitoxin; dysentery antitoxin, Shiga; perfringens antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; vibrion septique antitoxin; anticolon bacillus serum; antidysenteric serum; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; immune globulin (human); normal horse serum; pneumococcus typing serum; rabies vaccine (Pasteur); rabies vaccine (killed virus); smallpox vaccine; tuberculin old, tuberculin B. E , tuberculin B. F.; bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudo-diphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; tetanus toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization.

Antitoxin and Vaccine Laboratory, Department of Public Health, Commonwealth of Massachusetts, 375 South Street, Jamaica Plain, Boston 30, Mass.—License No 64:

Diphtheria antitoxin; scarlet fever streptococcus antitoxin; antiinfluenza bacillus serum; antimeningococcic serum; antipneumococcic serum; immune globulin (human); normal serum albumin; pneumococcus typing serum; smallpox vaccine; tuberculin old; bacterial vaccines made from paratyphoid bacillus A, paratyphoid bacillus B, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test.

United States Standard Products Co., Woodworth, Wis.—License No. 65:

Diphtheria antitoxin; perfringens antitoxin; tetanus antitoxin; vibrion septique antitoxin; smallpox vaccine; rabies vaccine (killed virus); bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigens made from staphylococcus albus, staphylococcus aureus; diphtheria toxoid; tetanus toxoid, diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; allergenic extracts (including pollens); poison ivy extract; poison oak extract.

D. L. Harris Laboratories, Metropolitan Building, St. Louis, Mo.—License No 66:

Rabies vaccine (Harris).

The Arlington Chemical Co., Yonkers, N. Y.—License No. 67:

Bacterial vaccines made from colon bacillus, Friedländer bacillus, micrococcus catarrhalis, micrococcus tetragenus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, and streptococcus; allergenic extracts (including pollens, animal derivatives, foods, and miscellaneous substances).

Dermatological Research Laboratories, Division of Abbott Laboratories, North Chicago, Ill.—License No. 68:

Arsphenamine; silver arsphenamine; neoarsphenamine; sulfarsphenamine; bismuth arsphenamine sulfonate; neosilver arsphenamine; trisodium sulfarsphenamine.

The Winthrop Chemical Co., Inc., 33 Riverside Avenue, Rensselaer, N. Y.—License No. 69:

Arsphenamine; arsphenamine diglucoside; neoarsphenamine; silver arsphenamine; sulfarsphenamine; acetylglycarsenobenzene; phenarsine hydrochloride.

Diarsenol Co., Inc., 72 Kingsley Street, Buffalo, N. Y.—License No. 70:

Arsphenamine; neoarsphenamine; sodium arsphenamine; sulfarsphenamine.

Mallinckrodt Chemical Works, St. Louis, Mo.—License No. 77:

Arsphenamine; neoarsphenamine; sulfarsphenamine.

Merck & Co., Inc., Rahway, N. J.—License No. 82:

Arsphenamine; neoarsphenamine; sulfarsphenamine; tryparsamide.

Terrell Laboratories, Texas National Bank Building, Fort Worth, Tex.—License No. 84:

Rabies vaccine (killed virus).

Jensen-Salsbery Laboratories, Twenty-first and Penn Streets, Kansas City, Mo.—License No. 86:
Botulism antitoxin; antianthrax serum, antierysipeloid serum; rabies vaccine (killed virus); bacterial vaccine made from Brucella melitensis; diphtheria toxin for Schick test; diphtheria toxoid.

Hollister-Stier Laboratories, Spokane, Wash., Los Angeles, Calif., and Wilkinsburg, Pa.—License No. 91:
Acute anterior poliomyelitis immune serum (human); bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catharrhalis, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and xerosis bacillus; allergenic extracts (including pollens, animal derivatives, foods, and miscellaneous substances); poison ivy extract, poison oak extract.

Medical Arts Laboratory, Medical Arts Building, Oklahoma City, Okla —License No 98:
Rabies vaccine (killed virus).

Bureau of Laboratories, Michigan State Department of Health, Lansing, Mich.—License No. 99:
Diphtheria antitoxin, scarlet fever streptococcus antitoxin; tetanus antitoxin; antimeningococcic serum; antipneumococcic serum; pneumococcus typing serum; rabies vaccine (Cumming), smallpox vaccine; tuberculin old; bacterial vaccines made from paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus and typhoid bacillus; diphtheria toxoid; tetanus toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization.

National Drug Co., 4663 Stenton Avenue, Philadelphia, Pa.—License No. 101
Diphtheria antitoxin, erysipelas streptococcus antitoxin; scarlet fever streptococcus antitoxin; perfringens antitoxin, staphylococcus antitoxin; tetanus antitoxin; vibrion septique antitoxin; antimeningococcic serum, antipneumococcic serum, antistreptococcic serum, immune globulin (human), normal horse serum, pneumococcus typing serum, tuberculin old, rabies vaccine (killed virus); smallpox vaccine, bacterial vaccines made from acne bacillus, Brucella melitensis, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, pyocyaneus bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus, diphtheria toxin-antitoxin mixture; diphtheria toxoid; staphylococcus toxoid; tetanus toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; streptococcus erythrogenic toxin; allergenic extracts (including pollens and miscellaneous substances); bacterial antigen made from staphylococcus aureus.

Mulford Colloid Laboratories, Thirty-eighth and Ludlow Streets, Philadelphia, Pa —License No 102: Poison ivy extract; poison oak extract.

Allergy Laboratories, 1200 North Walker Street, Oklahoma City, Okla.—License No 103.
Allergenic extracts (including pollens, foods, animal derivatives, and miscellaneous substances)

C. F. Kirk Co., New York, N. Y.—License No. 105:
Bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus, allergenic extracts (including pollens).

The Porro Biological Laboratories, 718 Medical Arts Building, Tacoma, Wash.—License No. 107:
Bacterial vaccines made from micrococcus catarrhalis, pneumococcus, staphylococcus aureus, and streptococcus, allergenic extracts (including pollens, animal derivatives, foods, and miscellaneous substances).

Central Pharmacal Co., Seymour, Ind.—License No. 109:
Bacterial antigens made from colon bacillus, Friedländer bacillus, gonococcus, micrococcus catarrhalis, pertussis bacillus, pneumococcus, pyocyaneus bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus

Pitman-Moore Co, Division of Allied Laboratories, Inc., Zionsville, Ind.—License No. 110:
Diphtheria antitoxin; perfringens antitoxin; tetanus antitoxin; vibrion septique antitoxin, antierysipeloid serum; immune globulin (human); normal horse serum; equine encephalomyelitis vaccine; rabies vaccine (killed virus), bacterial vaccines made from acne bacillus, colon bacillus, Brucella melitensis, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, micrococcus tetragenus, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diphtheria toxoid; staphylococcus toxoid; tetanus toxoid; diphtheria toxin for Schick test; allergenic extracts (including pollens); poison ivy extract; poison oak extract; bacterial antigens made from colon bacillus, gonococcus, staphylococcus albus, staphylococcus aureus, streptococcus.

The Wm. S. Merrell Co., Cincinnati, Ohio—License No. 111:
Bacterial vaccines made from colon bacillus, Friedländer bacillus, influenza bacillus, micrococcus catarrhalis, pneumococcus, staphylococcus albus, staphylococcus aureus, and streptococcus.

Wyatt Clinic Laboratories, Tucson, Ariz.—License No. 112:
Bacterial antigen made from streptococcus.

Michael Reese Hospital, Twenty-ninth Street and Ellis Avenue, Chicago, Ill.—License No. 118:
Acute anterior poliomyelitis immune serum (human); measles immune serum (human); mumps immune serum (human); scarlet fever immune serum (human); normal human plasma; normal human serum.

The Milwaukee Serum Center, Columbia Hospital, Milwaukee, Wis.—License No. 117:
Acute anterior poliomyelitis immune serum (human); measles immune serum (human); pertussis immune serum (human); scarlet fever immune serum (human); normal human serum.

Barry Allergy Laboratory, Michigan Theater Building, Detroit, Mich.—License No. 119:
Allergenic extracts (including pollens).

Biological Laboratory, Illinois Department of Health, 1800 West Fillmore Street, Chicago, Ill.—License No. 120.
Rabies vaccine (killed virus); bacterial vaccines made from typhoid bacillus; diphtheria toxoid; diphtheria toxin for Schick test.

State Department of Health, Austin, Tex.—License No. 121:
Rabies vaccine (killed virus); bacterial vaccines made from paratyphoid bacillus A, paratyphoid bacillus B, typhoid bacillus; diphtheria toxin for Schick test; diphtheria toxoid.

Manhattan Convalescent Serum Laboratory, Health Research Fund, Inc., Fifteenth Street and East River, New York, N. Y.—License No. 123:
Measles immune serum (human); mumps immune serum (human); scarlet fever immune serum (human); normal human serum.

Hynson, Westcott & Dunning, Baltimore, Md.—License No. 125:
Snake venom solution.

R. J. Strasenburgh Co., Rochester, N. Y.—License No. 127:
Bee venom ointment.

Research Foundation of Toledo Hospital, Inc., Toledo, Ohio.—License No. 128:
Bacterial antigen made from colon bacillus.

A. W. Kretschmar, Inc., 396 Broadway, New York, N. Y.—License No. 132:
Bee venom solution.

Michigan State College, East Lansing, Mich.—License No. 133:
Bacterial antigen made from Brucella melitensis.

Bio-Therapeutic Laboratories, 22 Halsted Street, East Orange, N. J.—License No. 135:
Bacterial antigens made from pyocyaneus bacillus, staphylococcus albus, staphylococcus aureus. staphylococcus citreus, and streptococcus.

Hoffmann-La Roche, Inc., Roche Park, Nutley, N. J.—License No. 136:
Bee venom.

Iowa State Department of Health Serum Center, Des Moines, Iowa.—License No. 137:
Measles immune serum (human); pertussis immune serum (human); poliomyelitis immune serum (human); scarlet fever immune serum (human); normal human serum.

University of Minnesota Human Serum Laboratory, Minneapolis, Minn.—License No. 138:
Measles immune serum (human); pertussis immune serum (human); poliomyelitis immune serum (human); scarlet fever immune serum (human); normal human serum.

Philadelphia Serum Exchange, The Children's Hospital, Philadelphia, Pa.—License No. 139:
Measles immune serum (human); mumps immune serum (human), pertussis immune serum (human); scarlet fever immune serum (human); normal human serum.

Hyland Laboratories, Los Angeles, Calif.—License No. 140:
Measles immune serum (human); mumps immune serum (human); pertussis immune serum (human); poliomyelitis immune serum (human); scarlet fever immune serum (human); normal human plasma; normal human serum.

The Venomin Co., Venice, Fla.—License No. 141:
Snake venom solution.

The Bayer Co., Inc., Rensselaer, N. Y.—License No. 142:
Acetylglycarsenobenzene; neoarsphenamine; silver arsphenamine; sulfarsphenamine.

The Hicks Laboratory, Tuscon, Ariz.—License No. 143:
Bacterial vaccine made from streptococcus.

Reichel Laboratories, Kimberton, Pa.—License No. 144:
Normal human plasma.

E. E. Bartos, Inc., Locust Valley, N. Y.—License No. 145:
Allergenic extracts (including foods).

Ben Venue Laboratories, Bedford, Ohio.—License No. 146:
Normal human plasma; normal human serum.

Endo Products, Inc., Richmond Hill, N. Y.—License No. 147:
Allergenic extracts (including miscellaneous substances).

FOREIGN ESTABLISHMENTS

Connaught Antitoxin Laboratory, University of Toronto, Toronto, Canada.—License No. 73:
Diphtheria antitoxin; staphylococcus antitoxin; tetanus antitoxin; diphtheria toxoid; staphylococcus toxoid.

Boots Pure Drug Co., Ltd., Nottingham, England.—License No. 92. Selling agents for the United States, The United Drug Co., 43 Leon Street, Boston, Mass.:
Arsphenamine diglucoside.

Laboratorio Brasileiro de Chimiotherapia, Rua General Roca No. 28, Rio de Janeiro, Brazil.—License No. 116. Selling agents for the United States and Hawaii, Ernst Bischoff Co., Inc., Ivoryton, Conn.; selling agents for Puerto Rico, Cesar A. Toro, Apartado 3854, Santurce, P. R.:
Fungus extracts.

Wellcome Physiological Research Laboratories, Beckenham, Kent, England.—License No. 129:
Russell viper venom.

Ayerst, McKenna & Harrison, Montreal, Canada.—License No. 134:
Staphylococcus toxoid; bacterial vaccines made from influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, streptococcus, and typhoid bacillus.

DEATHS DURING WEEK ENDED NOVEMBER 7, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov. 7, 1942	Corresponding week 1941
Data from 86 large cities of the United States:		
Total deaths	8,095	7,883
Average for 3 prior years	7,700	
Total deaths, first 44 weeks of year	355,906	355,349
Deaths per 1,000 population, first 44 weeks of year, annual rate	11.6	11.6
Deaths under 1 year of age	575	545
Average for 3 prior years	494	
Deaths under 1 year of age, first 44 weeks of year	24,443	22,322
Data from industrial insurance companies:		
Policies in force	65,224,094	64,617,631
Number of death claims	9,525	8,845
Death claims per 1,000 policies in force, annual rate	7.6	7.1
Death claims per 1,000 policies, first 44 weeks of year, annual rate	9.1	9.4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED NOVEMBER 14, 1942

Summary

Minor increases were recorded for the current week, as compared with the preceding week, for influenza, measles, meningococcus meningitis, poliomyelitis, smallpox, and whooping cough, although of these diseases the incidence of only influenza and meningococcus meningitis is above the 5-year (1937–41) median expectancy.

The incidence of meningococcus meningitis continues above that for any other year since 1937. The largest numbers of cases are still being reported from the Eastern States. Of 1,596 cases of influenza (last week, 1,576; 5-year median for the week, 1,115), 1,263, or approximately 80 percent, were reported from the South Atlantic and West South Central States, in which areas Texas reported 523 cases, Virginia 308, and South Carolina 293.

The incidence of endemic typhus fever declined from 100 cases to 87, of which 28 were reported in Texas and 22 in Georgia. One case was reported in Massachusetts.

Other reports for the week include 3 cases of undulant fever in Pennsylvania, 2 cases in Maryland, and 1 case in the District of Columbia; 1 case of rat-bite fever in Maryland, 12 cases of infectious encephalitis (6 in California), 1 case of Rocky Mountain spotted fever (in New Jersey), 9 cases of smallpox, and 10 cases of typhoid fever.

Conditions responsible for the recent rather high weekly urban mortality rates are not evident in the weekly reports of the common communicable diseases received from the State health officers. The death rate for the current week for 88 large cities in the United States is 12.0 per 1,000 population, as compared with 11.6 for the preceding week and 11.5 for the 3-year (1939–41) average. The recent increase in this rate does not appear to be localized. The mortality rates for both influenza and pneumonia for 89 cities reporting this information to the Public Health Service have recently been above the 3-year average.

Telegraphic morbidity reports from State health officers for the week ended November 14, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria: Week ended— Nov. 14, 1942	Diphtheria: Week ended— Nov. 15, 1941	Diphtheria: Median 1937–41	Influenza: Week ended— Nov. 14, 1942	Influenza: Week ended— Nov. 15, 1941	Influenza: Median 1937–41	Measles: Week ended— Nov. 14, 1942	Measles: Week ended— Nov. 15, 1941	Measles: Median 1937–41	Meningitis, meningococcus: Week ended— Nov. 14, 1942	Meningitis, meningococcus: Week ended— Nov. 15, 1941	Meningitis, meningococcus: Median 1937–41
NEW ENG.												
Maine	1	0	1	5	------	------	2	92	35	4	1	0
New Hampshire	0	0	0	1	------	------	43	3	4	0	0	0
Vermont	0	0	0	------	------	------	98	8	9	0	0	0
Massachusetts	2	8	3	------	------	------	220	101	105	1	8	1
Rhode Island	4	1	0	1	------	------	1	6	2	2	0	0
Connecticut	0	0	0	9	------	2	63	32	7	4	0	0
MID. ATL.												
New York	24	8	15	[1] 12	[1] 5	[1] 10	127	124	137	17	3	3
New Jersey	3	7	12	22	10	4	26	15	15	2	1	1
Pennsylvania	15	12	27	3	1	------	207	220	220	8	4	4
E. NO. CEN.												
Ohio	24	16	56	5	10	10	27	21	21	0	0	1
Indiana	6	27	27	6	52	12	29	17	17	1	1	1
Illinois	24	27	27	9	7	8	27	34	34	2	4	0
Michigan [2]	8	6	12	1	------	------	93	117	117	2	0	1
Wisconsin	1	2	2	29	36	36	56	116	60	0	2	0
W. NO. CEN.												
Minnesota	20	1	4	1	------	6	5	21	28	0	0	0
Iowa	3	4	7	2	2	1	43	18	18	0	0	0
Missouri	4	11	13	2	6	4	5	13	9	0	0	1
North Dakota	1	1	3	14	12	1	1	57	6	0	0	0
South Dakota	1	0	1	------	------	1	8	1	1	1	0	0
Nebraska	4	1	1	5	------	------	49	2	2	0	0	0
Kansas	5	6	6	------	16	5	9	22	9	0	0	0
SO. ATL.												
Delaware	0	0	0	------	------	------	0	0	0	0	0	0
Maryland [3]	11	17	9	1	9	5	9	40	7	4	0	0
District of Columbia	0	1	4	2	1	1	3	1	1	0	0	0
Virginia	28	35	66	308	160	114	7	86	35	3	1	2
West Viginia	14	8	13	17	26	14	2	182	24	0	0	1
North Carolina	59	63	86	1	9	3	1	98	98	0	1	0
South Carolina	40	26	21	293	276	139	2	3	5	3	0	0
Georgia	24	44	40	14	53	36	4	8	8	0	0	0
Florida	5	4	6	1	------	2	1	8	5	0	0	0
E. SO CEN												
Kentucky	10	11	18	3	1	4	4	2	12	0	1	1
Tennessee	18	24	24	22	26	28	29	20	20	4	0	0
Alabama	28	24	27	27	70	62	2	8	8	1	0	2
Mississippi [3]	10	18	23	------	------	------	------	------	------	0	2	1
W. SO. CEN.												
Arkansas	15	36	30	35	108	24	12	32	8	0	0	0
Louisiana	12	9	13	3	16	11	1	0	0	1	0	0
Oklahoma	10	22	22	65	141	25	1	23	3	0	0	0
Texas	56	75	65	523	1,085	200	21	49	29	3	0	0
MOUNTAIN												
Montana	0	3	2	1	1	1	4	9	8	0	0	0
Idaho	0	1	0	------	------	------	12	18	17	0	0	0
Wyoming	1	2	1	39	6	------	7	2	2	0	0	0
Colorado	16	22	8	37	31	28	3	110	13	0	0	0
New Mexico	1	1	5	1	1	1	0	8	8	0	0	0
Arizona	2	6	5	22	96	55	2	40	5	0	0	0
Utah [2]	2	0	1	1	8	3	264	23	23	0	0	0
Nevada	0	0	------	1	------	------	3	1	------	0	0	------
PACIFIC												
Washington	3	0	5	1	2	4	312	2	18	2	0	0
Oregon	1	5	4	7	7	12	117	34	14	0	0	0
California	35	12	23	44	82	28	41	349	111	4	1	1
Total	551	602	836	1,596	2,372	1,115	2,003	2,191	2,191	69	80	80
45 weeks	12,959	13,602	19,498	92,868	504,189	177,864	478,155	837,604	357,617	3,089	1,767	1,767

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 14, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Nov. 14, 1942	Nov. 15, 1941		Nov. 14, 1942	Nov. 15, 1941		Nov. 14, 1942	Nov. 15, 1941		Nov. 14, 1942	Nov. 15, 1941	
NEW ENG.												
Maine	1	0	0	8	15	10	0	0	0	1	0	0
New Hampshire	1	3	0	15	9	2	0	0	0	0	0	0
Vermont	0	0	0	9	2	2	0	0	0	0	0	0
Massachusetts	0	1	1	197	156	123	0	0	0	1	1	1
Rhode Island	0	1	0	21	8	8	0	0	0	1	0	0
Connecticut	1	0	0	44	32	32	0	0	0	0	2	1
MID. ATL.												
New York	7	28	6	224	208	208	0	0	0	7	6	9
New Jersey	9	6	3	71	88	62	0	0	0	1	3	3
Pennsylvania	0	8	8	152	163	189	0	0	0	5	9	14
E. NO. CEN.												
Ohio	4	8	5	181	149	210	0	0	0	6	8	8
Indiana	5	6	2	57	86	104	0	0	1	0	3	3
Illinois	11	12	4	170	168	248	1	0	3	3	2	6
Michigan [3]	2	5	5	63	178	242	0	0	3	3	1	2
Wisconsin	2	4	4	133	113	116	1	0	3	0	0	1
W. NO. CEN.												
Minnesota	2	2	4	54	46	64	0	1	2	4	0	0
Iowa	2	1	3	41	43	62	0	1	1	2	1	1
Missouri	1	0	1	55	62	62	0	1	1	2	2	2
North Dakota	0	2	0	13	16	24	0	0	0	0	0	1
South Dakota	3	0	0	18	13	13	0	0	0	1	0	0
Nebraska	7	0	0	15	13	15	0	0	0	0	6	0
Kansas	1	1	1	37	85	98	0	0	1	1	0	4
SO. ATL.												
Delaware	0	1	0	19	12	10	0	0	0	0	0	0
Maryland [3]	0	2	0	53	50	35	0	0	0	11	4	4
Dist. of Col.	0	2	0	19	17	10	0	0	0	0	0	0
Virginia	0	7	1	85	79	65	0	1	0	2	9	9
West Virginia	1	1	1	35	67	84	0	0	0	1	5	5
North Carolina	0	5	2	116	83	89	1	0	0	2	3	4
South Carolina	0	3	1	20	14	14	0	0	0	4	3	3
Georgia	1	4	2	42	63	40	0	1	0	4	8	8
Florida	2	4	1	10	4	4	0	0	0	3	2	2
E. SO. CEN.												
Kentucky	1	3	3	57	54	74	1	0	0	6	15	8
Tennessee	0	29	0	97	122	100	0	1	0	6	4	7
Alabama	3	4	1	36	63	42	0	0	0	1	4	4
Mississippi [3]	0	3	2	21	12	14	0	0	0	0	3	4
W. SO. CEN.												
Arkansas	2	3	1	13	7	13	1	0	1	1	4	7
Louisiana	0	1	1	10	2	11	0	0	1	6	11	7
Oklahoma	0	1	1	23	20	29	0	0	1	0	1	5
Texas	12	2	3	47	75	71	1	0	4	4	7	13
MOUNTAIN												
Montana	0	1	0	11	29	29	0	0	0	0	0	0
Idaho	0	0	0	1	6	11	0	0	0	0	0	0
Wyoming	0	1	0	6	9	6	0	0	0	0	3	0
Colorado	2	0	0	33	29	29	0	0	2	1	1	2
New Mexico	0	0	0	7	6	6	0	0	0	3	1	3
Arizona	4	1	0	1	6	6	0	0	0	1	0	0
Utah [3]	3	1	0	11	8	24	0	0	0	1	0	0
Nevada	1	0	------	1	1	--------	0	0	------	0	0	------
PACIFIC												
Washington	1	0	1	35	20	30	3	0	0	0	0	2
Oregon	0	5	3	22	6	13	0	0	1	1	0	1
California	17	2	2	109	134	133	0	2	1	2	4	7
Total	109	174	174	2,518	2,651	2,841	9	8	44	98	136	185
46 weeks	[illegible]	[illegible]	[illegible]	[illegible]	107,437	[illegible]	[illegible]	[illegible]	9,091	[illegible]	7,757	11,726

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 14, 1942—Continued

Division and State	Whooping cough, Week ended Nov. 14, 1942	Whooping cough, Week ended Nov. 15, 1941	Week ended November 14, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	62	48	0	0	0	0	0	0	0	0	0
New Hampshire	3	44	0	0	0	0	0	0	0	0	0
Vermont	42	9	0	0	0	0	0	0	0	0	0
Massachusetts	207	158	0	0	11	0	0	0	0	0	1
Rhode Island	29	12	0	0	0	0	0	0	0	0	0
Connecticut	70	54	0	0	1	0	0	0	0	0	0
MID. ATL.											
New York	470	466	0	2	18	0	0	0	0	0	0
New Jersey	244	224	0	0	0	0	0	0	1	0	0
Pennsylvania	326	0	0	0	0	0	0	0	0	0	0
E. NO. CEN.											
Ohio	184	178	0	0	0	0	0	0	0	1	0
Indiana	22	39	0	0	0	0	0	0	0	1	0
Illinois	152	202	0	2	15	0	3	0	0	0	0
Michigan [2]	232	304	0	2	0	0	0	0	0	0	0
Wisconsin	143	244	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	40	52	0	0	0	0	0	0	0	0	0
Iowa	18	15	0	0	0	0	0	0	0	0	0
Missouri	5	32	0	0	0	3	0	0	0	0	0
North Dakota	7	13	0	0	0	0	0	0	0	0	0
South Dakota	0	6	0	0	0	0	0	0	0	0	0
Nebraska	11	0	0	0	0	0	0	0	0	0	0
Kansas	17	79	0	0	0	0	1	0	0	4	0
SO. ATL.											
Delaware	1	9	0	0	0	0	0	0	0	0	0
Maryland [2]	87	28	0	0	0	13	1	0	0	0	0
Dist. of Col.	12	21	0	0	0	0	0	0	0	0	0
Virginia	50	101	0	0	0	33	0	0	0	1	1
West Virginia	7	60	0	0	0	0	0	0	0	0	0
North Carolina	41	127	0	0	0	0	0	0	0	0	6
South Carolina	20	32	0	0	2	0	0	0	0	0	3
Georgia	19	21	0	2	2	0	0	0	0	0	22
Florida	16	6	0	0	2	0	0	0	0	0	18
E. SO. CEN.											
Kentucky	19	52	0	0	0	0	0	0	0	0	0
Tennessee	27	22	0	1	0	0	0	0	0	0	1
Alabama	9	9	0	0	0	0	0	0	0	0	1
Mississippi [2]	--------	--------	0	0	0	0	0	0	0	0	2
W. SO. CEN.											
Arkansas	44	11	--------	0	1	0	0	0	0	1	1
Louisiana	4	2	0	0	0	0	0	0	0	0	3
Oklahoma	4	23	0	0	0	0	0	0	0	0	0
Texas	85	71	0	5	116	0	0	0	0	0	28
MOUNTAIN											
Montana	11	35	0	0	0	0	0	0	0	0	0
Idaho	0	5	0	0	0	0	0	0	0	0	0
Wyoming	3	2	0	0	0	0	0	0	0	0	0
Colorado	5	81	0	0	0	0	1	0	0	0	0
New Mexico	8	20	0	0	3	0	0	0	0	0	0
Arizona	9	3	0	0	0	29	0	0	0	0	0
Utah [2]	7	29	0	0	0	0	0	0	0	0	0
Nevada	0	64	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	21	111	0	0	0	0	0	0	0	0	0
Oregon	8	18	0	0	0	0	0	0	0	0	0
California	257	164	0	3	9	0	6	0	0	2	0
Total	2,998	3,296	0	17	181	78	12	0	1	10	87
45 weeks	155,529	184,160	--------	--------	--------	--------	--------	--------	--------	--------	--------

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended October 31, 1942

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	0	0	11	1	0	0	8	0	10	0	2	2
Baltimore, Md	2	0	1	1	1	0	12	0	14	0	2	81
Billings, Mont	0	0	-----	0	0	0	1	0	0	0	0	2
Birmingham, Ala	1	0	1	1	0	1	3	0	1	0	0	0
Boise, Idaho	0	0	-----	0	0	0	0	0	0	0	0	0
Boston, Mass	0	1	-----	0	8	5	13	0	47	0	3	33
Bridgeport, Conn	0	0	-----	0	0	0	2	0	2	0	0	0
Brunswick, Ga	0	0	-----	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	-----	1	21	1	7	0	7	0	0	9
Camden, N. J	1	0	-----	0	2	0	1	0	0	0	0	18
Charleston, S. C	4	1	3	1	0	0	1	0	0	0	0	1
Charleston, W. Va	0	0	1	0	0	0	0	0	2	0	0	0
Chicago, Ill	16	0	-----	1	8	2	25	5	39	0	2	78
Cincinnati, Ohio	11	0	-----	0	5	0	0	0	19	0	1	2
Cleveland, Ohio	4	0	8	0	1	0	8	1	32	0	0	54
Columbus, Ohio	1	0	-----	0	0	0	0	0	12	0	0	3
Concord, N. H	0	0	-----	0	1	0	1	2	0	0	0	0
Cumberland, Md	0	0	-----	0	0	0	0	0	0	0	1	0
Dallas, Texas	1	0	-----	0	0	0	1	0	10	0	0	5
Denver, Colo	7	0	21	0	4	0	5	1	1	0	4	3
Detroit, Mich	3	0	1	1	4	1	12	2	24	0	0	79
Duluth, Minn	0	0	-----	0	0	0	0	0	2	0	0	2
Fall River, Mass	0	0	-----	0	0	0	3	0	4	0	0	12
Fargo, N. Dak	0	0	1	1	0	0	0	0	2	0	0	0
Flint, Mich	0	0	-----	0	0	0	4	0	1	0	0	14
Fort Wayne, Ind	0	0	-----	0	0	0	0	0	0	0	0	0
Frederick, Md	0	0	-----	0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	-----	0	0	0	2	0	0	0	0	0
Grand Rapids, Mich	0	0	-----	0	2	0	2	0	0	0	0	5
Great Falls, Mont	0	0	-----	0	0	0	0	0	2	0	0	3
Hartford, Conn	0	0	-----	0	0	0	3	0	1	0	0	9
Helena, Mont	0	0	-----	0	0	0	0	0	0	0	0	0
Houston, Tex	1	0	-----	0	0	0	3	0	1	1	0	2
Indianapolis, Ind	1	0	-----	0	0	1	7	1	15	0	0	11
Kansas City, Mo	0	0	-----	1	0	0	8	0	20	0	0	1
Kenosha, Wis	0	0	-----	0	0	0	0	0	1	0	0	1
Little Rock, Ark	0	0	-----	0	1	0	3	0	0	0	0	0
Los Angeles, Calif	13	0	13	1	2	0	8	11	21	0	0	41
Lynchburg, Va	3	0	-----	0	0	0	3	0	1	0	1	0
Memphis, Tenn	0	0	2	0	3	0	1	0	3	0	1	8
Milwaukee, Wis	0	0	1	1	21	0	7	0	32	0	0	26
Minneapolis, Minn	8	0	-----	0	2	1	0	1	16	0	0	7
Missoula, Mont	0	0	-----	0	0	0	2	0	0	0	0	1
Mobile, Ala	1	0	1	0	0	0	1	0	1	0	1	0
Nashville, Tenn	1	0	-----	1	0	0	0	0	3	0	0	0
Newark, N. J	0	0	8	0	4	2	8	1	6	0	0	19
New Haven, Conn	0	0	-----	0	2	1	2	0	1	0	0	11
New Orleans, La	2	0	1	1	0	0	0	0	4	0	1	5
New York, N. Y	20	1	9	2	12	11	55	8	93	0	6	122
Omaha, Nebr	0	0	-----	1	0	0	2	0	3	0	0	0
Philadelphia, Pa	4	0	-----	0	78	8	23	0	34	0	1	116
Pittsburgh, Pa	3	0	-----	0	0	1	10	0	6	0	0	12
Portland, Maine	0	0	-----	0	1	2	1	0	2	0	2	12
Providence, R. I	2	0	-----	0	2	1	2	0	2	0	0	8
Pueblo, Colo	0	0	-----	0	1	0	2	0	1	0	0	0
Racine, Wis	0	0	-----	0	8	0	0	0	0	0	0	0
Raleigh, N. C	2	0	-----	0	0	0	1	0	9	0	0	0
Reading, Pa	0	0	-----	0	0	0	0	0	0	0	0	15
Richmond, Va	0	0	-----	0	0	0	3	0	0	0	0	8

City reports for week ended October 31, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Roanoke, Va	0	0	------	0	0	0	0	0	0	0	2	0
Rochester, N. Y	0	0	------	0	1	0	1	0	7	0	0	29
Sacramento, Calif	5	0	------	0	0	0	0	0	3	0	0	7
St. Joseph, Mo	0	0	------	0	0	0	2	0	1	0	0	0
St. Louis, Mo	2	0	2	2	0	0	17	1	15	0	0	6
St. Paul, Minn	0	0	------	0	0	0	5	0	3	0	1	8
Salt Lake City, Utah	2	0	------	1	41	0	1	0	7	0	0	5
San Antonio, Tex	2	0	3	3	0	0	1	1	8	0	0	0
San Francisco, Calif	1	0	------	1	6	0	8	1	6	0	0	6
Savannah, Ga	0	0	1	1	0	0	2	0	0	0	0	2
Seattle, Wash	0	0	------	0	7	0	6	1	1	0	0	4
Shreveport, La	1	0	------	0	0	0	5	0	0	0	0	0
South Bend, Ind	0	0	------	0	0	0	0	0	0	0	0	0
Spokane, Wash	0	0	------	0	12	0	1	1	6	0	0	1
Springfield, Ill	0	0	------	0	0	0	1	0	0	0	0	20
Springfield, Mass	0	0	------	0	6	0	3	0	28	0	0	5
Superior, Wis	0	0	------	0	0	0	0	0	2	0	0	7
Syracuse, N. Y	0	0	------	0	3	1	1	2	1	0	1	18
Tacoma, Wash	0	0	------	0	62	0	0	0	0	0	0	1
Tampa, Fla	1	0	------	0	0	0	0	0	0	0	0	0
Terre Haute, Ind	0	0	------	0	0	0	1	0	1	0	0	0
Topeka, Kans	0	0	------	0	0	0	0	0	1	0	0	0
Trenton, N. J	0	0	------	0	1	0	4	0	5	0	0	1
Washington, D. C	0	0	1	1	0	1	13	0	22	0	1	14
Wheeling, W. Va	0	0	------	1	2	0	3	1	0	0	0	8
Wichita, Kans	0	0	------	0	0	0	2	0	2	0	1	5
Wilmington, Del	0	0	------	0	0	0	4	0	1	0	0	1
Wilmington, N. C	0	0	------	0	0	0	0	0	1	0	0	2
Winston-Salem, N. C	2	0	------	0	1	0	0	0	1	0	0	0
Worcester, Mass	0	0	------	0	0	0	5	0	10	0	0	17

Anthrax.—Cases: Philadelphia, 1.
Dysentery, amebic—Cases: Los Angeles, 4.
Dysentery, bacillary—Cases: Baltimore, 1, Charleston, S. C., 6, Chicago, 1; Detroit, 1; Fall River, 1; Los Angeles, 2, Nashville, 2; New York, 21; Richmond, 6; San Francisco, 1.
Dysentery, unspecified—Cases: San Antonio, 3.
Typhus fever.—Cases: Atlanta, 5; Brunswick, 3; Dallas, 1; Little Rock, 1; Mobile, 1; Nashville, 2; New Orleans, 1.

Rates (annual basis) per 100,000 population for the group of 89 cities in the preceding table (estimated population, 1942, 34,123,289)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Oct. 31, 1942	18.80	12.99	8.97	50.58	52.87	96.88	0.15	5.20	152.65
Average, 1937–41	18.22	11.58	[1] 2.77	[2] 63.32	[1] 48.27	95.60	0.46	5.41	157.37

[1] 3-year average, 1939–41.
[2] Median.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended October 17, 1942.—During the week ended October 17, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick [1]	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	--------	4	--------	--	1	----	--------	-------	1	6
Chickenpox	--------	6	--------	126	119	43	19	9	43	365
Diphtheria	--------	7	--------	36	1	6	--------	2	--------	52
Dysentery	--------	------	--------	10	-----	-------	--------	-------	--------	10
German measles	--------	-----	--- ---	2	8	-------	1	3	4	18
Influenza	--------	5	--------	--	5	----	1	-------	1	12
Measles	--------	----	--------	39	21	7	31	-------	2	100
Mumps	--------	12	--------	115	182	12	38	21	92	472
Pneumonia	--------	2	--------	--- --	14	-------	--------	-------	9	25
Poliomyelitis	--------	4	--------	2	4	2	1	-----	2	15
Scarlet fever	--------	2	--------	107	75	8	9	29	27	257
Tuberculosis	--------	5	--------	57	48	16	--------	5	8	139
Typhoid and paratyphoid fever	--------	------	--------	19	5	--- --	--------	1	--------	25
Undulant fever	--------	------	--------	-	1	----- -	--------	-------	--------	1
Whooping cough	--------	5	--------	237	68	18	11	14	15	368
Other communicable diseases	--------	7	--------	1	255	37	--------	-------	8	308

[1] No report was received from New Brunswick Province for the above period.

JAMAICA

Communicable diseases—4 weeks ended October 24, 1942.—During the 4 weeks ended October 24, 1942, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	1	8	Puerperal fever	--------	1
Diphtheria	2	3	Tuberculosis	18	72
Dysentery	4	1	Typhoid fever	9	79
Leprosy	1	11			

SWITZERLAND

Notifiable diseases—July 1942.—During the month of July 1942, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	10	Mumps	100
Chickenpox	170	Paratyphoid fever	51
Diphtheria	143	Poliomyelitis	104
Dysentery	2	Scarlet fever	211
German measles	34	Tuberculosis	409
Influenza	3	Typhoid fever	23
Lethargic encephalitis	1	Undulant fever	23
Measles	673	Whooping cough	143

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Morocco.—During the week ended October 24, 1942, 6 cases of plague were reported in Morocco.

Typhus Fever

Algeria.—For the period October 1–10, 1942, 72 cases of typhus fever were reported in Algeria.

Morocco.—During the week ended October 24, 1942, 44 cases of typhus fever were reported in Morocco.

Rumania.—During the week ended October 31, 1942, 15 cases of typhus fever were reported in Rumania.

Tunisia.—For the period October 1–10, 1942, 105 cases of typhus fever were reported in Tunisia. For the period September 11–20, 1942, 62 cases of typhus fever were reported in Tunisia instead of 84 cases as previously reported.

Yellow Fever

Nigeria—Oshogbo.—During the week ended October 10, 1942, 1 suspected case of yellow fever was reported in Oshogbo, Nigeria.

COURT DECISION ON PUBLIC HEALTH

Statute creating hospital and health board for a particular county alone held invalid.—(Georgia Supreme Court; *Hood* v. *Burson et al.*, 20 S.E.2d 755; decided May 26, 1942, rehearing denied June 17, 1942.) In 1941 the legislature of Georgia enacted a law creating a hospital and health board for Carroll County. The board was charged with the duties and responsibilities of the public health board of the county and was designated as such for carrying into effect in the county the so-called Ellis health law of the State and for carrying on any public health clinics and activities in the county. Power was given the board to act for the people of the county in all matters pertaining to public health, public hospitalization, and public medical and dental clinics, in accordance with the laws then in force or which might thereafter be enacted. The Ellis health law provided for the creation of a county board of health for each county, which boards were to have supervision over all matters relating to health and sanitation in their respective counties. In the State constitution it was set forth that laws of a general nature should have uniform operation throughout the State and that no special law should be enacted in any case for which provision had been made by an existing general law.

The act relating to Carroll County alone was attacked as being a special or local law for which provision had been made by an existing general law (the Ellis health law) and, therefore, violative of the said constitutional provision. The supreme court of Georgia stated that the act creating a hospital and health board for Carroll County was by its own terms territorially local, not permitting of application to any other counties in the State, "Therefore it is a special or local law." The Ellis health law, continued the court, was a general law of uniform operation throughout the State and was "none the less so because of the optional principle dependent on grand jury action in the particular county before it goes into effect there." After reviewing the two laws, the court said that, insofar as matters of public health were concerned, the local act attempted to legislate upon a subject for which provision had been made by an existing general law, namely, the Ellis health law. The legislature having entered the field of public health for the counties in the State by the latter general law, and the subsequent special or local act establishing a hospital and health board for Carroll County being an enactment for which provision had been made by existing general law, the court held that the special act violated the above-mentioned constitutional provision and was invalid.

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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Public Health Reports

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DISTRIBUTION OF HEALTH SERVICES IN THE STRUCTURE OF STATE GOVERNMENT*

CHAPTER VII—MATERNITY-CHILD HEALTH ACTIVITIES BY STATE AGENCIES

By JOSEPH W. MOUNTIN, *Assistant Surgeon General*, and EVELYN FLOOK, *United States Public Health Service*

All States now recognize in varying degrees the requirements of mothers and children for health and related welfare services. Accordingly, provisions of broad health programs have been focused particularly upon these population groups. In addition, certain other measures designed especially for mothers and children have been initiated to supplement the more general health services.

The extent to which these latter purposes have been accomplished and the agencies through which the services are administered form the central theme of this article, which constitutes chapter VII of Public Health Bulletin No. 184—Third Edition. The present revision, being published serially in the Public Health Reports, is more comprehensive than its predecessors.[1] Besides the activities of

*From the States Relations Division. This is the seventh chapter of the third edition of Public Health Bulletin No. 184. Previous chapters are.

Mountin, Joseph W., and Flook, Evelyn: Distribution of health services in the structure of State government—Chapter I. The composite pattern of State health services. Pub. Health Rep., 56: 1673 (August 22, 1941). Reprint No. 2306.

Mountin, Joseph W., and Flook, Evelyn: Distribution of health services in the structure of State government—Chapter II. Communicable disease control by State agencies. Pub. Health Rep., 56: 2283 (November 21, 1941). Reprint No. 2334.

Mountin, Joseph W., and Flook, Evelyn: Distribution of health services in the structure of State government—Chapter III. Tuberculosis control by State agencies. Pub. Health Rep., 57: 65 (January 16, 1942). Reprint No. 2348.

Mountin, Joseph W., and Flook, Evelyn: Distribution of health services in the structure of State government—Chapter IV. Venereal disease control by State agencies. Pub. Health Rep., 57: 553 (April 17, 1942). Reprint No. 2360.

Mountin, Joseph W., and Flook, Evelyn: Distribution of health services in the structure of State government—Chapter V. Sanitation by State agencies. Pub. Health Rep., 57: 885 (June 12, 1942) and 917 (June 19, 1942) Reprint No. 2386.

Mountin, Joseph W., and Flook, Evelyn: Distribution of health services in the structure of State government—Chapter VI. Medical and dental care by State agencies. Pub. Health Rep., 57: 1196 (August 14, 1942) and 57: 1235 (August 21, 1942). Reprint No. 2395.

Succeeding chapters will be published in subsequent issues of the Public Health Reports.

[1] Ferrell, John A., Smillie, Wilson G., Covington, Platt W., and Mead, Pauline A.; International Division of the Rockefeller Foundation for the Conference of State and Provincial Health Authorities of North America. Health Departments of States and Provinces of the United States and Canada. Public Health Bulletin No. 184 (Revised). United States Government Printing Office, Washington, 1932. First edition, April 1929.

State health departments, it describes for the survey year (1940) the functions of all departments of State government which contribute to group or individual health by any one or any combination of the following means: Regulation, promotion, education, supervision, consultation, financial aid, or direct service. In this chapter it is proposed to picture activities of all official units of State governments for the advancement of maternity and child health. Briefly, such activities feature promotion of local maternity-child health facilities; postgraduate education of nurses and physicians in improved obstetric and pediatric techniques; provision of consultation service to practicing physicians; education of the laity in prenatal and child hygiene; direct operation of or extension of financial aid to prenatal and well-child clinics; provision of medical, dental, nursing, and hospital care during pregnancy, delivery, and the postpartum period, of medical, dental, nursing, and hospital care for children, and of special facilities for care of prematurely born infants; control of midwife practices; supervision of maternity hospitals and child-caring institutions; periodic examination of school children; and health instruction of school teachers and children.

The present discussion is built around these and other services set up specifically to meet the health needs of mothers and children. Services for crippled children are omitted from this chapter, however, and handled elsewhere [2] since medical care is the predominant element in such services, whereas preventive and health promotional measures are the chief constituents among activities covered herein. It must be borne in mind that many general health services vitally affect the health of mothers and children and actually furnish a framework for programs organized specifically for these selected population groups. Outstandingly significant are laboratory diagnosis, generalized public health nursing, public health education in its broader aspects, dentistry, general medical care, mental hygiene, sanitation—particularly fly extermination and supervision of milk supplies, and the control of general communicable diseases, tuberculosis, and the venereal diseases. All of these activities, which have an important bearing upon the health of mothers and children yet are not designed for them exclusively, have been, or will be, accorded separate treatment in other chapters.[3] Only State maternity and child health programs having a specialized content of their own are subject to analysis in the present report.

Neither services of local official health agencies nor those of voluntary organizations are included. Activities of Federal agencies, likewise, are without the range of the study. Consequently, reference to Federal participation in maternity and child hygiene would have no

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[2] See text footnote* (chapter VI).

[3] See text footnote*.

place in this article, which, as already mentioned, is limited to consideration of State health services, were it not for the fact that State efforts have been enlarged appreciably as a result of Federal financial aid. Under authority of title V of the Social Security Act, enacted in 1935 and amended in 1939, an annual Federal appropriation is made for grants to States in order that health services to mothers and children might be extended and improved, especially in rural areas and in areas suffering from severe economic distress.[4] The United States Children's Bureau is charged with the administration of these grants-in-aid. Apportionment of assistance is based on live births and financial need plus a flat, uniform allotment to each State. A State's eligibility for Federal aid is dependent also upon payment of part of the costs of approved plans from funds appropriated by the State or its local subdivisions.[4] On the whole, this Federal assistance has been a substantial factor in the extension of State maternity services to cover the prenatal, delivery, and postnatal periods and in the further development of child health activities which now benefit preschool and school children as well as infants.

AGENCIES THAT PARTICIPATE IN ACTIVITIES FOR MATERNITY AND CHILD HEALTH

To a large extent, State activities in the interest of maternity and child health are now centered within five departments of State government. Without exception, the health department is the particular unit which is primarily concerned with measures for improving the health of mothers and children. (See table 1.) In all but six States, the department of education collaborates with the health department insofar as the health of school children is concerned. Services of participating welfare departments, on the other hand, are concentrated upon approval and supervision of maternity hospitals, child-boarding homes, child-caring institutions, and/or child-placing agencies. Departments of labor commonly prescribe conditions for employment of women and children and occasionally pass upon structural details of school buildings which affect the health of children. State university hospitals, 20 of which are listed, afford prenatal, obstetrical, and/or pediatric care through both their in-patient and out-patient departments.

Other governmental units that function less frequently in some phase of the State maternity-child health programs are licensing departments, boards, or commissions and a miscellaneous group which

[4] For the terms under which Federal funds for maternity-child health services are allotted, see secs. 502 and 504 of the Social Security Act.

The procedure for making allotments and providing for payments to the States is described in Children's Bureau Publications No. 253, Grants to States for Maternity and Child Welfare under the Social Security Act of 1935 and the Social Security Act Amendments of 1939 (Washington, 1940), No. 254, Federal and State Cooperation in Maternity and Child-Welfare Services under the Social Security Act (Washington, 1939), and No. 259, Maternal and Child Health Services under the Social Security Act; Development of the Program, 1936–39 (Washington, 1941). Children's Bureau, U. S. Department of Labor.

TABLE 1.—*Official State agencies participating in activities for maternity and child health* in each State and Territory, the District of Columbia, and the Virgin Islands***

State or Territory	Department of State government						
	Health	Welfare, social security, or public assistance	Education	Department of industrial relations, department or commission of labor, department of labor and industry, industrial commission, etc.	State university or college	Department of registration and education, committee on licensure or independent licensing and examining boards	Other
Alabama	X	X	X	X			
Arizona	X		X	X			
Arkansas	X	X	X	X	X		
California	X	X	X	X	X	X	
Colorado	X	X		X	X	X	
Connecticut	X	X	X	X			
Delaware	X		X	X			
District of Columbia	X		X			X	X[a]
Florida	X		X	X			
Georgia	X	X	X	X			
Idaho[b]	X	X	X	X			
Illinois	X	X		X	X	X	
Indiana	X	X	X	X	X		
Iowa	X	X	X	X	X		
Kansas	X	X	X	X	X		X
Kentucky	X		X	X			
Louisiana	X	X	X	X		X	X[c]
Maine[b]	X	X	X	X			
Maryland	X		X	X	X		
Massachusetts	X	X	X	X		[illegible]	
Michigan	X	X	X	X	X		
Minnesota	X	X	X	X	X	X	
Mississippi	X		X	X			X
Missouri	X	X	X	X	X		
Montana	X	X		X			
Nebraska	X			X	X		X
Nevada	X		X	X			
New Hampshire	X	X	X	X			
New Jersey	X	X	X	X		X	
New Mexico	X	X	X	X			X
New York	X	X	X	X			
North Carolina	X	X	X	X			
North Dakota	X	X	X	X			
Ohio	X	X	X	X	X	X	
Oklahoma	X		X	X	X		
Oregon	X		X	X	X		
Pennsylvania	X	X	X	X	X		X
Rhode Island	X	X	X	X			X
South Carolina	X			X			
South Dakota	X	X	X	X			
Tennessee	X			X			
Texas	X	X	X	X	X		
Utah	X		X	X		X	
Vermont	X	X	X	X			
Virginia	X	X	X	X	X[a]		
Washington	X	X	X	X			
West Virginia	X	X	X	X			X
Wisconsin	X	X	X	X	X	X	
Wyoming	X		X	X		X	
Alaska	X	X	X				X
Hawaii	X	X	X		X		
Puerto Rico	X		X	X			X
Virgin Islands	X		X			X	X

*Child health activities include those for infant, preschool, and school groups.

**Any differences between information presented in this table and corresponding entries in table 1, chapter I, of this series are the result of combining several activities originally shown separately, or of further refinement of the data since publication of the initial article.

[a] Two agencies of this classification.

[b] The department of health is really a division (Idaho) and bureau (Maine) of public health, subordinate to the department of welfare (Idaho) and the department of health and welfare (Maine).

[c] Three independent hospital boards administering five separate institutions.

includes a State architect, art commission, highway engineer, minimum wage and industrial safety board, State legislature, State eleemosynary board, board of commissioners, two boards of control, two governors, and several independent State hospitals. Independent State hospitals and similar establishments administered by a board of control or eleemosynary board are likely to participate through operation of prenatal clinics in their out-patient departments and acceptance of maternity cases for delivery service. Licensing departments, boards, or commissions attempt to restrict, to some extent at least, the number of untrained birth attendants who practice as midwives. Approval of construction plans for school buildings is the manner by which State architects, highway engineers, and art commissions contribute to child health, while the board of district commissioners and the governors recorded in table 1 function through participating in the formulation of rules and regulations significant to the health of mothers and children. In one State, the legislature makes direct appropriations to several private hospitals as reimbursement for the free delivery service rendered by those institutions.

CONTENT OF STATE MATERNITY-CHILD HEALTH PROGRAMS

In a discussion devoted to the program content and methods of administering State maternity-child health activities, the reader would soon become lost in detail were it not for the possibility of classifying the various approaches to the problem under several broad functional categories. Consequently, table 2 was organized for concise presentation of the vast body of subject matter which describes the manner in which each agency of State government operates with respect to any health problem. The functions discharged, it will be recalled, may be described as regulatory authority, promotional and educational activities, supervision and consultation, financial aid, and direct operation of service facilities. Subitems of the tabulation reveal the particular means by which the several approaches apply to maternity and child health. Because for some maternity and child health services it is difficult to differentiate between direct State operation and extension of financial aid to activities administered locally, the functional classifications "distributes financial aid" and "operates a direct service program" have been merged in this report under the heading "provides personnel or financial assistance for local service."

Equal stress is not placed on all types of activities by the agencies performing the service; consequently, the discussion which follows will not accord the same amount of consideration to all items listed. Neither will amplification of significant activities always follow the same order in which the respective functions are recorded. Although

the various types of direct and financially aided service have been categorized in table 2 as *maternity health, infant and preschool health,* and *school health,* the lines of demarcation may be less noticeable in discussion because of the overlapping and interweaving of the several branches of service. For instance, reduction of infant mortality rates depends in part upon lowering the number of premature births, birth injuries, and the like. These, in turn, will be diminished by more expectant mothers receiving adequate care throughout the complete maternity cycle. Moreover, because in many instances there is parallel organization of the two branches of service, much repetition may be avoided by merging the description thereof. Finally, a more coherent picture sometimes results from consecutively featuring all aspects of a single branch of activity than from recurrent consideration of that activity as it relates to each of the major functions. Health instruction of school children, for example, is such an important element of the complete school health program that it can be discussed more effectively in conjunction with school examinations than as part of the broader educational activities. Likewise, separate treatment of the licensure, supervision, and instruction of midwives (involving regulation, education, supervision, and direct service) would necessitate discussion of such length that attention to midwifery would appear out of all proportion to the actual weight given this phase of State maternity and child health programs.

According to table 2, which demonstrates the manner whereby each agency of State government functions with respect to maternity and child health, most State[5] health departments give special emphasis to the establishment and maintenance of local facilities equipped to render complete service during pregnancy, delivery, infancy, the preschool period, and the school age. The exact manifestations of such efforts vary from State to State, however, depending upon the extent to which promotion of local endeavors rests on advice, supervision, or financial aid from the State agency. Monetary grants, be it said, may be made either for specific clinic services or for total or partial payment of salaries to local public health personnel.

In twenty-odd States departments of education are concerned with promotion of the physical examination of school children. Occasionally, as in Indiana and Virginia, the department of welfare as well as the department of health functions in a promotional fashion for the establishment of local infant and preschool health facilities.

State departments of health, education, and welfare which operate in a supervisory and advisory capacity are, for the most part, the same

[5] The term "State" as used in the discussion which follows includes the States, the Territories, the District of Columbia, and the Virgin Islands.

Table 2.—*Department of State government* responsible for specific duties designed to improve maternity and/or child health in each State and Territory, the District of Columbia, and the Virgin Islands***

Activity	State or Territory							
	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia
Promulgates and/or enforces State laws, rules, and regulations pertaining to maternity and child health	1, 2[h], 3[e], 4	1, 3[e], 4	1, 3[e], 4	1, 2[d], 3[e], 4	1, 4	1, 2[d], 3[e], 4	1, 3[e], 4	1, 3[e], 7
Promotes local maternity-child health programs	1, 3	1	1, 3[e]	1, 3[e]	1	1[b], 3[e]	1	-----
Conducts educational programs for:								
The general public	1, 3	1	1, 3	1	1	1	1	1
Local physicians	1	1	1	1	1	1	1[e]	-----
Public health nurses	1	1	1	1	1	1	1	1
Private duty nurses		---	-----	-----	-----	1	-----	-----
Midwives	1		1	-----		1	1	-----
Teachers and/or student teachers	3	1	3	1	1	1, 3	-----	1, 3
School children	3	1, 3	1, 3	1, 3	-----	3	3	1, 3
Supervises and/or provides consultation service to local organizations	1	1	1, 3[e]	1, 3[e]	1	1[b], 3[e]	1	-----
Provides personnel or financial assistance for local maternity health services:								
Prenatal and/or postnatal clinics	1	1	1	1, 5	1, 5	-----	1	1
Prenatal and/or postnatal home nursing service	1	1	1	1	1	1	1	1
Free delivery service—								
Hospital	1[k], 2[l]	1	2, 5	5	1[k], 2[l], 5	2[l]	-----	1
Home—								
Nursing	1[k]	----	- -	1	1[k]	1[k]	-----	-
Medical	1[k], 2[l]	-----		-----	1[k], 2[l]	2[l]	-----	-----
Free incubator service		---	5	1	1[k]	--	-----	1
Free obstetrical consultation service	1	1	1	1	1	1	-----	-----
Maternity demonstration projects in selected areas	1	-----	-----	-----	1	1	-----	----
Additional service not covered in this classification	-----	-----	-	-----	-----	1	----	1
Engages in following activities from the State level:								
Follow-up studies of reports of maternity deaths	1	1	1	1	-----	1	1	1
Licensure of maternity hospitals or homes	2	--	-	1	1	1	-----	1
Licensure or registration of midwives	1	1	1	6	6	1	1	6
Supervision of midwives	1	- -	---	-----	-----	1	1	-----
Provides personnel or financial assistance for local infant and preschool health services:								
Clinics for infants and/or preschool children	1	1	1	1, 5	1	1	1	1
Home nursing service for promotion of clinic attendance and follow-up work	1	1	1	1	1	1	1	1
Free pediatric consultation service	1	-----	-----	1	1	1	-----	-----
Engages in following activities from the State level:								
Special studies of infant mortality records	1	1	1	1	1	1	1	1
Licensure and/or approval of child-caring institutions	2	-----	-----	2	-----	2	-----	1
Provides personnel or financial assistance for local school health services								
Physical examination of school children	1[n], 3[k]	1[n]	1[n]	1[n]	1[n]	3[k]	1	1
Follow-up nursing service to promote and help arrange for correction of defects	1	1	1	1	1	1	1	1
Engages in following activities from the State level:								
Special studies of health problems of school children	1	-----	1	1	1[k]	1, 3[k]	1	1
Approval of construction plans of school buildings	3	-----	1	1, 3	-----	1, 3	1, 3	1, 3

See footnotes at end of table.

TABLE 2.—*Department of State government responsible for specific duties designed to improve maternity and/or child health in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	Florida	Georgia	Idaho[a]	Illinois	Indiana	Iowa	Kansas	Kentucky
	State or Territory							
Promulgates and/or enforces State laws, rules, and regulations pertaining to maternity and child health	1, 3[e], 4	1, 2[d], 3[e], 4	1, 2[d], 3[e], 4	1, 2[b], 4, 6[e]	1, 2[b], 3[e], 4, 5[e]	1, 2[d], 3[e], 4	1[f], 2[b], 3[e], 4, 5[h], 7	1, 3[e], 4
Promotes local maternity-child health programs	1, 3[e]	1, 3[e]	1	1	1, 2[d], 3[e]	1	1, 3[e]	1[b]
Conducts educational programs for:								
The general public	1	1	1	1	1	1	1	1
Local physicians	1	1	1	1	1	1	1	-----
Public health nurses	1	1	1	1	1	1	1	1
Private duty nurses	1	-----	1	1	1	1	-----	-----
Midwives	1	1	-----	-----	1	-----	1	1
Teachers and/or student teachers	1, 3	1	1	1	1	1, 3	1, 3	3
School children	-----	1, 3	3[j]	-----	1, 3	3	3	3
Supervises and/or provides consultation service to local organizations	1, 3[e]	1, 3[e]	1	1	1, 2[d]	1, 3[e]	1, 3[e]	1
Provides personnel or financial assistance for local maternity health services:								
Prenatal and/or postnatal clinics	1	1	1	5	1	1[k]	1, 5	1
Prenatal and/or postnatal home nursing service	1	1	1	1	1	1	1, 5	1
Free delivery service—								
Hospital	-----	-----	-----	2[l], 5	5	1, 5	2[l], 5	-----
Home—								
Nursing	1	1[k]	1	1[k]	1[k]	1[k]	5	1[k]
Medical	1[k]	-----	-----	2[l]	-----	1[k], 2[l]	2[l], 5	-----
Free incubator service	-----	-----	-----	1	1	1	1	1[k]
Free obstetrical consultation service	1	1	-----	1	1	1	-----	-----
Maternity demonstration projects in selected areas	1	1	-----	1	1	1	1	-----
Additional service not covered in this classification	-----	-----	-----	1	-----	-----	-----	1
Engages in following activities from the State level:								
Follow-up studies of reports of maternity deaths	1	1	1	-----	1	1	1	1
Licensure of maternity hospitals or homes	-----	-----	2	1	2	1	1	-----
Licensure or registration of midwives	1	1	-----	6	-----	-----	-----	1
Supervision of midwives	1	1	-----	-----	1	-----	1	-----
Provides personnel or financial assistance for local infant and preschool health services:								
Clinics for infants and/or preschool children	1	1	-----	1, 5	1	1[k]	1, 5	1
Home nursing service for promotion of clinic attendance and follow-up work	1	1	1	1	1	1	1	1
Free pediatric consultation service	1	1	-----	1	-----	1	-----	1
Engages in following activities from the State level:								
Special studies of infant mortality records	1[k]	1	1	1[k]	1	1	-----	1
Licensure and/or approval of child-caring institutions	-----	-----	-----	2	2	2	-----	-----
Provides as a State service or assists local communities in financing the following services for school health:								
Physical examination of school children	1	1	1[n]	1[k]	1[n]	1[n]	1[k, n]	1
Follow-up nursing service to promote and help arrange for correction of defects	1	1	1	1	1	1	1	1
Engages in following activities from the State level:								
Special studies of health problems of school children	1	1	-----	1	1, 5	1	1	1
Approval of construction plans of school buildings	3	1, 3	1, 3	1	1	1[k]	7	3

See footnotes at end of table.

TABLE 2.—*Department of State government responsible for specific duties designed to improve maternity and/or child health in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	Louisiana	Maine[a]	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri
	State or Territory							
Promulgates and/or enforces State laws, rules, and regulations pertaining to maternity and child health	1, 3[c], 4	1, 2[d], 3[e], 4	1, 3[e], 4	1, 2[d], 3[e], 4	1[b], 2[b], 3[e], 4	1, 2[b], 3[e], 4, 5[e]	1, 3[e], 4	1, 2[b], 3[e], 4
Promotes local maternity-child health programs	1	1, 3[e]	1	1	1, 3[e]	1	1	1, 3[e]
Conducts educational programs for:								
The general public	1, 3	1	1	1	1	1	1	1
Local physicians	1	1	1	1	1	1	1	1
Public health nurses	1	1	1	1	1	1	1	1
Private duty nurses	---	-----	-----	1	------	------	------	-----
Midwives	1	----	1	-----	------	1	1	1[i]
Teachers and/or student teachers	3	3	1	1	1, 3	3	1	1, 3
School children	3	3	1	1, 3	------	3	1	3
Supervises and/or provides consultation service to local organizations	1	1, 3[e]	1	1	1, 3[e]	1, 3[e]	1	1, 3[e]
Provides personnel or financial assistance for local maternity health services:								
Prenatal and/or postnatal clinics	1	1[k]	1, 5	1	1, 5	5	1	-----
Prenatal and/or postnatal home nursing service	1	1	1	1	1	1	1	1
Free delivery service—								
Hospital	7[m]	1, 2[l]	5	2	5	5	7	5
Home—								
Nursing	1[k]	1	1[k]	1	1[k]	1	-----	-----
Medical	1[k], 2[l]	1, 2[l]	1, 5	------	1[k]	1, 2[l]	-----	--
Free incubator service	1[k]	1	1	------	1	1[k]	-----	--
Free obstetrical consultation service	1	1	1	1	1	1	1	-----
Maternity demonstration projects in selected areas	1	------	------	------	----	1	-----	---
Additional service not covered in this classification	1	-----	------	1	------	------	------	-----
Engages in following activities from the State level:								
Follow-up studies of reports of maternity deaths	.	1	1	1	1	1	1	1
Licensure of maternity hospitals or homes		1	---	2	2	2	------	2
Licensure or registration of midwives	6		1		-	6	1	1
Supervision of midwives	1	--- -	--- -	------	-----	1	1	1[i]
Provides personnel or financial assistance for local infant and preschool health services:								
Clinics for infants and/or preschool children	1	1	1	1	1, 5	5	1	1
Home nursing service for promotion of clinic attendance and follow-up work	1	1	1	1	1	1	1	1
Free pediatric consultation service	-----	1	1	1	1	1	------	1
Engages in following activities from the State level:								
Special studies of infant mortality records	------	1	1	1[k]	1	1	------	1
Licensure and/or approval of child-caring institutions	-----	2	------	2	2	2	------	2
Provides personnel or financial assistance for local school health services:								
Physical examination of school children	-----	------	1[n]	1, 3	1[n]	-------	1[n]	1
Follow-up nursing service to promote and help arrange for correction of defects	1	------	1	1	1	1	1	1
Engages in following activities from the State level:								
Special studies of health problems of school children	1	1	1	1	1	1	------	1
Approval of construction plans of school buildings	3	1, 3	3	------	3	1	1, 3	3

See footnotes at end of table.

TABLE 2.—*Department of State government responsible for specific duties designed to improve maternity and/or child health in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina
	State or Territory							
Promulgates and/or enforces State laws, rules, and regulations pertaining to maternity and child health	1, 4	1, 4, 7[e]	1, 3[e], 4	1, 2[d], 3[e], 4	1[b], 3[e], 4	1, 3[e], 4	1[b], 2[d], 3[e], 4	1, 2[b], 3[e], 4
Promotes local maternity-child health programs	1	1	1	1[b], 3[e]	1[b], 3[e]	1	1[b], 3[e]	1
Conducts educational programs for.								
The general public	1	1	1	1	1	1	1, 3	1
Local physicians	1	1	1	1	1	1	1[e]	1
Public health nurses	1	1	1	1	1	1	1	1
Private duty nurses	1	------	------	------	------	1	1	1
Midwives	------	------	1	------	1	1	1	1
Teachers and/or student teachers	1	------	1	3	3	3	3	1, 3
School children	1	------	3	3	3	3	3	1, 3
Supervises and/or provides consultation service to local organizations	1	1	1	1[b], 3[e]	1[b], 3[e]	1	1, 3[e]	1
Provides personnel or financial assistance for local maternity health services:								
Prenatal and/or postnatal clinics	-	1[k], 5	1	1	1	------	1	1
Prenatal and/or postnatal home nursing service	1	1	1	1	1	1	1	1
Free delivery service—								
Hospital	2[l]	5	1	------	2[l]	1, 2[l], 7	2[l]	.
Home—								
Nursing	1	5	1	1[k]	1, 2[l]	1	1	1[k]
Medical	2[l]	5	1	------	2[l]	1, 2[l]	2[l]	1[k]
Free incubator service	1[l]	1	1	1	1	-	1	-
Free obstetrical consultation service	1	1		1	1	1	------	1
Maternity demonstration projects in selected areas	------	1	------	------	------	1	1	1
Additional service not covered in this classification	------	------	------	1	------	------	1	------
Engages in following activities from the State level:								
Follow-up studies of reports of maternity deaths	1	1	1	1	1	------	1	1
Licensure of maternity hospitals or homes	------	7	------	1	1	------	1	2
Licensure or registration of midwives	------	------	------	------	6	1	1	1
Supervision of midwives	------	------	------	------	1	------	1	1
Provides personnel or financial assistance for local infant and preschool health services:								
Clinics for infants and/or preschool children	1	1[k]	1	1	1	------	1	1
Home nursing service for promotion of clinic attendance and follow-up work	1	1	1	1	1	1	1	1
Free pediatric consultation service	------	1	1	1[l]	1	------	1	1
Engages in following activities from the State level:								
Special studies of infant mortality records	1	1	1	1	1	1	1	1
Licensure and/or approval of child-caring institutions	------	------	------	2	------	------	2	------
Provides personnel or financial assistance for school health services:								
Physical examination of school children	1[a]	------	------	3	1[k, a]	1[a]	3	1, 3
Follow-up nursing service to promote and help arrange for correction of defects	1	1	1	1, 3	1	1	1	1
Engages in following activities from the State level:								
Special studies of health problems of school children	1	1	1[l]	1, 3	1, 3	------	3	1
Approval of construction plans of school buildings	1	------	------	3	1, 3	3	3	------

See footnotes at end of table.

TABLE 2.—*Department of State government responsible for specific duties designed to improve maternity and/or child health in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota
Promulgates and/or enforces State laws, rules, and regulations pertaining to maternity and child health	1, 2[b], 3[e], 4	1, 3[e], 4, 5[e]	1, 3[e], 4, 5[e]	1, 3[e], 4	1, 2[b], 3[e], 4, 5, 7[g]	1[b], 3[e], 4	1, 4	1, 2[d], 3[e], 4
Promotes local maternity-child health programs	1	1, 3[e]	1	1, 3[e]	1[e]	1[b], 3[e]	1	1
Conducts educational programs for:								
The general public	1	1	1	1, 3	1	1	1	1
Local physicians	1	------	1	1	1	1	1	1
Public health nurses	1	1	1	1	1	1	1	1
Private duty nurses	------	1	------	1	------	------	------	1
Midwives	------	------	------	------	1	------	1	-
Teachers and/or student teachers	1, 3	1, 3	1	1	3	3	------	1
School children	1, 3	3	3	1, 3	1, 3	------	------	3[j]
Supervises and/or provides consultation service to local organizations	1, 3[e]	1, 3[e]	1	1, 3[e]	1, 2[d]	1[b], 3[e]	1	1
Provides personnel or financial assistance for local maternity health services:								
Prenatal and/or postnatal clinics	------	1[k], 5	------	5	1, 2, 5	------	1	1[k]
Prenatal and/or postnatal home nursing service	1	1	1	1	1	1	1	1
Free delivery service—								
Hospital	2[l]	2[l], 5	5	2[l], 5	2, 5	2, 7	------	--
Home—								
Nursing	1[k]	1[k]	1[k]	1	------	2	1[k]	1[k]
Medical	2[l]	2[l], 5	1[k], 5	2[l]	------	2	------	1[k]
Free incubator service	------	------	------	1	1	1	------	------
Free obstetrical consultation service	------	------	1	------	------	------	1	------
Maternity demonstration projects in selected areas	1	1	1	------	------	------	1	1
Additional service not covered in this classification	------	------	------	------	------	------	------	------
Engages in following activities from the State level.								
Follow-up studies of reports of maternity deaths	1	------	1	1	------	1	1	1
Licensure of maternity hospitals or homes	2	1	------	1	2	2	------	1
Licensure or registration of midwives	------	6	------	------	3	1	1	------
Supervision of midwives	------	------	------	------	1	1	1	------
Provides personnel or financial assistance for local infant and preschool health services:								
Clinics for infants and/or preschool children	1	1[k]	------	5	1, 5	1	1	1[k]
Home nursing service for promotion of clinic attendance and follow-up work	1	1	1	1	1	1	1	1
Free pediatric consultation service	------	------	1	------	------	1	------	------
Engages in following activities from the State level:								
Special studies of infant mortality records	1[k]	1	1	1	1	1	1	1
Licensure and/or approval of child-caring institutions	2	2	------	------	2[k]	2	------	2[i]
Provides personnel or financial assistance for school health services:								
Physical examination of school children	1	------	1[n]	1[k], [a]	1	3	1[n]	1
Follow-up nursing service to promote and help arrange for correction of defects	1	1	1	1	1	1	1	1
Engages in following activities from the State level:								
Special studies of health problems of school children	------	1	------	------	1	1	------	1
Approval of construction plans of school buildings	1, 3	1, 7	[a] 3	3	1, 3, 7[g]	3	------	1

See footnotes at end of table

TABLE 2.—*Department of State government responsible for specific duties designed to improve maternity and/or child health in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory							
	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin
Promulgates and/or enforces State laws, rules, and regulations pertaining to maternity and child health	1[b], 4	1, 2[d], 3[e], 4	. 3[e], 4	1, 3[e], 4	1, 3[e], 4	1, 3[e], 4	1, 3[e], 4	1, 2[d], 3[e], 4, 5[e]
Promotes local maternity-child health programs	1[b]	1[b]	1	1	1, 2[d], 3[h]	1[b]	1	1, 3[e]
Conducts educational programs for:								
The general public	1	1	1	1	1	1	1	1
Local physicians	1	1	1	1	1	1	1	1
Public health nurses	1	1	1	1	1	1	1	1
Private duty nurses	......	......	......	......	......	......	......	......
Midwives	......	1	......	......	1	......	1	......
Teachers and/or student teachers	......	1	1	3	1	1	1	1
School children	......	3	1, 3	1, 3	3	1, 3	1, 3	1, 3
Supervises and/or provides consultation service to local organizations	1[b]	1, 3[e]	1	1	1, 3[e]	1[b]	1	1, 3[e]
Provides personnel or financial assistance for local maternity health services:								
Prenatal and/or postnatal clinics	......	1	1	......	1, 5[g]	1	1	1
Prenatal and/or postnatal home nursing service	1	1	1	1[k]	1	1	1	1
Free delivery service—								
Hospital	......	5	......	......	5[g]	1[k], 2[l]	2, 7	2[l], 5
Home—								
Nursing	......	1[i]	1[k]	1[k]	......	1[k]	2	......
Medical	......	......	1[k]	......	5[g]	1[k], 2[l]	2	2[l]
Free incubator service	1	1	1	1	1[i]	1	1	1
Free obstetrical consultation service	......	1	1	......	1	1	......	1
Maternity demonstration projects in selected areas	......	......	1	1	1	1	1	1
Additional service not covered in this classification	......	......	......	......	......	......	......	1
Engages in following activities from the State level:								
Follow-up studies of reports of maternity deaths	......	1	1	1	1	1	......	1
Licensure of maternity hospitals or homes	......	1	1	......	1	......	......	1, 2
Licensure or registration of midwives	......	......	6	......	1	......	1	6
Supervision of midwives	......	1	......	......	1	......	......	......
Provides personnel or financial assistance for local infant and preschool health services:								
Clinics for infants and/or preschool children	1[k]	1	1	1	1, 5[g]	1	1	1
Home nursing service for promotion of clinic attendance and follow-up work	1	1	1	1	1	1	1	1
Free pediatric consultation service	......	1	1	......	......	1	......	1
Engages in following activities from the State level.								
Special studies of infant mortality records	1	1	1	......	1	1	1	1
Licensure and/or approval of child-caring institutions	......	2	......	2	2	......	2	2
Provides personnel or financial assistance for local school health services:								
Physical examination of school children		1[i], 3	1[k]	1	1	1[n]	1[n]	1[k, n]
Follow-up nursing service to promote and help arrange for correction of defects	1	1	1	1, 3	1	1	1	1
Engages in following activities from the State level:								
Special studies of health problems of school children	......	1, 3[i]	......	1, 3	1	......	......	1, 3
Approval of construction plans of school buildings	......	1, 3	3	1, 3	1	3	......	3, 7

See footnotes at end of table.

Table 2.—*Department of State government responsible for specific duties designed to improve maternity and/or child health in each State and Territory, the District of Columbia, and the Virgin Islands*—Continued

Activity	State or Territory				
	Wyoming	Alaska	Hawaii	Puerto Rico	Virgin Islands
Promulgates and/or enforces State laws, rules, and regulations pertaining to maternity and child health	1, 3[e], 4	1, 2[e], 3[e], 7	1, 2[d], 3[e]	1, 3[e], 4, 7	1, 3[e], 7
Promotes local maternity-child health programs	1, 3[e]	1	1, 3[e]	1[f]	-------
Conducts educational programs for:					
The general public	1	1	1, 3	-------	-------
Local physicians	1	1[e]	1	-------	-------
Public health nurses	1	1	1, 5	1	-------
Private duty nurses	-------	1	1, 5	-------	-------
Midwives	-------	-------	1	1	1
Teachers and/or student teachers	1	1	1, 3	-------	1
School children	1[j], 3[j]	3	3	-------	3
Supervises and/or provides consultation service to local organizations	1	1	1, 3[e]	1[f]	-------
Provides personnel or financial assistance for local maternity health services:					
Prenatal and/or postnatal clinics	1	1[k]	1	1	1
Prenatal and/or postnatal home nursing service	1	1	1	1	1
Free delivery service—					
Hospital	-------	2[l]	-------	1	1
Home—					
Nursing	1	1	-------	-------	1
Medical	-------	-------	-------	-------	1
Free incubator service	1	-------	1	-------	-------
Free obstetrical consultation service	-------	-------	-------	1	-------
Maternity demonstration projects in selected areas	-------	1	-------	-------	-------
Additional service not covered in this classification	-------	-------	-------	-------	-------
Engages in following activities from the State level:					
Follow-up studies of reports of maternity deaths	1	1	1	1	-------
Licensure of maternity hospitals or homes	-------	-------	1	-------	-------
Licensure or registration of midwives	6	-------	1	1	6, 7
Supervision of midwives	-------	-------	1	1	1
Provides personnel or financial assistance for local infant and preschool health services:					
Clinics for infants and/or preschool children	1	1	1	1	1
Home nursing service for promotion of clinic attendance and follow-up work	1	1	1	1	1
Free pediatric consultation service	-------	1	1	1	-------
Engages in following activities from the State level:					
Special studies of infant mortality records	1	1	1	1	-------
Licensure and/or approval of child-caring institutions	-------	-------	2	-------	-------
Provides personnel or financial assistance for local school health services:					
Physical examination of school children	1[k]	1, 3	1	1	1
Follow-up nursing service to promote and help arrange for correction of defects	1	1	1	1	3
Engages in following activities from the State level:					
Special studies of health problems of school children	1	1	1, 3	-------	-------
Approval of construction plans of school buildings	3	7	1, 3	1, 3	3

*Code:
1. Department of health
2. Department of welfare, social security, or public assistance
3. Department of education
4. Department of industrial relations, industrial commission, department of labor and industry
5. State university or college
6. Department of registration and education, committee on licensure; independent licensing and examining boards
7. Other departments of State government

**Activities described herein are those which were in operation at the time this survey was made in 1940. Reports submitted to the United States Children's Bureau for the entire year 1940 indicate that, in some instances, additional services were initiated subsequent to the date of interview for this study.

[a] The department of health is really a division (Idaho) and bureau (Maine) of public health, subordinate to the department of public welfare (Idaho) and the department of heath and welfare (Maine).
[b] Maternity and infant and preschool health only.
[c] School health only.
[d] Infant and preschool health only.
[e] Maternity health only.
[f] Maternity and school health only.
[g] Two agencies of this classification function in this capacity.
[h] Infant and preschool and school health only.
[i] Program in beginning stages; indicated agency authorized—however, little or nothing done.
[j] First through eighth grades, inclusive.
[k] Not routinely; for selected areas (usually for demonstration); for selected cases; upon request; or under other special conditions.
[l] As part of State's participation in general medical care for the needy.
[m] Three independent hospital boards, administering five separate institutions, function in this capacity.
[n] Not specifically for this activity as such, but as part of the general health program.

ones which engage in promotional activities. Such supervision and advice pertain to organization of local facilities, to method of procedure, and to the kind and amount of service which might reasonably be expected from the staffs of local governmental units.

To say that stimulation of local interest in the physical betterment of mothers and children is furthered by the educational measures employed by most State health departments only partially indicates the importance of education in the over-all effort to raise the health level of this segment of the population. As a matter of fact, education is the principal approach utilized by official State agencies in the maternity-child health program. Even in the rendering of direct service there is no cleavage between care and personal instruction of the patient.

Educational methods utilized are of several distinct types, depending upon whether they are directed toward professional groups or the laity. Practically all health departments include popular educational campaigns in their maternity-child health programs. While radio talks and skits, newspaper and magazine articles, are prepared for the public at large, certain nonprofessional bodies, usually mothers' clubs, parent-teachers' associations, and similar community service organizations, are selected as a nucleus for imparting information based on recommended procedures for maternity and child hygiene. The foregoing groups, which are reached through lectures, films, demonstrations, and distribution of literature, are then depended upon to disseminate further the knowledge acquired. Subject matter presented by these methods is apt to emphasize the necessity of seeking medical attention early in the term of pregnancy, the importance of returning for physical check-up at regular intervals throughout the prenatal period, the effect of proper rest and diet upon both mother and child, principles of child care, measures for preventing communicable diseases, criteria of normal child development, the advisability of periodic medical examination for children and the correction of physical defects thus located. More detailed medical instruction is offered the mothers who avail themselves of the prenatal or well-child clinic services maintained by the health department.

As already implied, special educational programs in obstetrics and pediatrics are arranged for persons upon whom mothers and children rely for professional care. Refresher courses for local physicians and dentists are presented through seminars, lectures before county medical societies, personal instruction by the consultant obstetrician

or pediatrician attached to the State health department staff, or formal, intramural postgraduate study. Institutes and regional conferences for local public health nurses nearly always include discussion of the latest developments in prenatal and postnatal home nursing service and care of the newborn, as well as consideration of the nurses' responsibility as clinic assistant, health educator, and promoter of recurrent examination of infants and preschool children. Selected nurses are awarded scholarships for extended courses dealing with such specialized problems as assistance at complicated deliveries or the care of premature infants. Others are given instruction in home delivery service by means of demonstrations and actual field participation. A few health departments include in their educational pursuits nurses on private duty as well as public health nurses. Staff physicians, likewise, are excused from duty to attend intramural courses in advanced obstetrics and pediatrics, while health department dentists are given leave of absence for further study of children's dentistry.

Women functioning as midwives constitute another group for whom special instruction is planned. In a number of States, many maternity patients are economically unable to afford the services of a physician; in other areas, the number of physicians practicing in a community is inadequate; while in still other sections, traditions originating in foreign countries foster preference for midwife care. Consequently, in such localities quite a high percentage of births are attended by nonmedical persons. Rarely are these attendants regular midwives. Instead, they are usually untrained neighbor women who, because they attend several births a year, have come to be known as midwives. In an effort to improve the situation, about 50 percent of the State health departments have worked out plans for instructing these so-called midwives in elementary principles to be observed when attending a woman at childbirth. Manuals are prepared for those whose level of intelligence permits learning by such methods. In addition, there is oral teaching and demonstration, both individually and in groups. Physicians as well as public health nurses serve as instructors. Features of midwife education include maintenance of properly equipped bags, techniques of delivery, use of silver nitrate, completion of birth certificates, personal and home hygiene, limitations of midwifery, and knowledge of conditions which require the services of a physician.

Approximately two-fifths of the State health departments reported that they also maintain some system of supervision which serves as

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a check upon application of the principles which are taught. Such supervision includes periodic inspection of midwives' bags, observance of their delivery practices, or follow-up visits within twenty-four hours of a birth to check upon their procedures. States vary as to whether physicians or nurses are employed as midwife supervisors.

Another line of approach to the midwife problem is through regulatory requirement that no nonmedical person shall serve as a birth attendant unless she is licensed as a midwife. The declared practices of the States are given herewith, notwithstanding the fact that large proportions of women in lower economic groups are dependent upon nonmedical attendants, irrespective of whether such attendants come within the purview of any licensing scheme. About three-fifths of the States (nine more than in 1930) prohibit midwives from practicing unless they possess a permit, certificate, or license awarded by the unit of government officially charged with such licensure. In 20 States the health department is the agency which issues midwife licenses, and in 13 States this function is performed by a board of medical examiners or the department of registration for licenses. Requirements for licenses or permits sometimes include the passing of a physical examination; an examination based on knowledge of procedures to be followed when attending a birth; certification by one or more local physicians as to the applicant's ability, habits, and general reputation; and management of a specified number of deliveries under a physician's guidance. At one extreme, the control attempted through licensure is, in effect, an exclusion process designed to eliminate from qualification a majority of the candidates; at the other end of the scale, licensing amounts to little more than routine registration. Even within individual States economic conditions and social attitudes determine local practices that occupy varying positions within this wide range.

Participation in local maternity, infant, and preschool clinic services is an outstanding function of State health departments. Several distinct patterns are followed in supplying personnel or funds. Members of the State staff may serve as clinicians, the State agency may pay the fees and traveling expenses of local clinicians, or State assistance may be limited to the provision of equipment and supplies. In all, nearly four-fifths of the State health departments either supply personnel or financially aid local maternity (prenatal and postnatal) clinics, while all but three of them contribute in one way or another to similar facilities for infants and preschool children. For the most part, the purpose of State performance and aid as herein described is to supplement inadequate local facilities or to reinforce such facilities where special problems exist. On the other hand, the primary objective may be to demonstrate to selected communities the workability and benefits of the services afforded. Under still other circumstances,

the policy of direct State service is an outgrowth of general organization and policy which characterizes the entire system of government in certain jurisdictions. The out-patient departments of some State university hospitals also operate clinics for mothers and children. Prenatal clinics are sponsored by about a dozen State hospitals, and pediatric clinics by nearly as many.

Eligibility for clinic service depends, to a large extent, upon a patient's economic status. While a few States indicate that the service offered is open to all, most of them stipulate that only the medically needy—variously defined as "all who cannot provide service by their own resources," "referrals from physicians and social workers," "people of county hospital level," "all midwife cases," and "those with a maximum income of $20.00 per week per couple, plus $3.50 per week for each child"—are accepted. On the whole, economic restrictions for admission to maternity services are more stringent than for admission to services for children.

The precise scope of services offered in the clinics of the several States varies, but always the aim is to bring under medical and nursing supervision persons who otherwise would have no opportunity to receive professional attention. Furthermore, it is the common aim to begin such supervision early in the period of pregnancy and continue it uninterruptedly throughout the mother's prenatal, puerperal, and postpartum span. Health supervision of children is planned to extend through infancy, preschool, and school life. In the main, maternity clinics offer both antepartum and postpartum medical examination and treatment as well as medical and nursing advice. Patients discovered to be in need of types of medical treatment not available in the clinic are usually referred to private physicians.

In only two jurisdictions, Alabama and Puerto Rico, are birth control clinics operated directly by State health departments; in another, Virginia, the out-patient department of a State-owned general hospital maintains such a clinic. Interest of the North Carolina health department in the program of birth control is expressed through its promotion of the establishment of such clinics at the local level, while in South Carolina, State health department personnel are available for supervision of and consultation to local birth control clinics.

Clinics for infants and preschool children are chiefly examination centers where the educational rather than the clinical phase of child health is emphasized. Ways and means of securing correction for the medical and nutritional defects and unhygienic practices found are given consideration by the clinician and nurse in attendance, and mothers are personally instructed regarding their children's special needs and proper care. Nutritional instruction is emphasized par-

ticularly. Not infrequently, diphtheria immunizations, smallpox vaccinations, and tuberculin tests are performed as part of the clinic routine. Dental examinations likewise are often included. The extent to which children's dentistry is a constituent service of broader child health programs is demonstrated in chapter VI of this series of articles.[6]

Because periodic medical supervision is believed to be vitally important both to mothers during the term of pregnancy and to infants and preschool children, regularity of schedule is stressed in planning clinic sessions both for prenatal patients and for infants and preschool children. Several State health departments have purchased medical trailers or healthmobiles which contain all necessary equipment for conducting maternity and well-child clinics. In these mobile units the State staff travels, circuit fashion, from one point to another, making return visits as frequently as is feasible. By this system, duplication of equipment is avoided, time of personnel is conserved, and professional services are more widely distributed. Furthermore, communities without satisfactory clinic quarters are no longer denied service. To facilitate transportation of mothers and children to clinic centers, it sometimes proves most practical in rural communities to combine the maternity and child conferences into a single service facility.

Provision of home nursing service for prenatal and postnatal cases, for infants, and for preschool children is an element of the maternity-child health programs of all State health departments. In extending home nursing services, the State agency functions either through direct assignment of State nurses to particular localities, through loan of nurses from the central staff for emergency service in selected communities, or through subsidy of local nursing activities by means of complete or partial payment of their salaries and travel. Nurses supplied under any of these arrangements serve both mothers and children. This is to be expected, since rarely are the nurses specialists in either field, but regular public health nurses engaged in generalized health activities.

Participation in free nursing or medical delivery service for maternity cases is one of the more recently developed functions of State health departments. Seldom is such service available for the entire State. The more usual policy has been to introduce it into selected sections having especially high mortality rates. This plan has evolved from the experience of lowering such rates with the provision of proper obstetrical care. Most of the areas selected for these services lacked sufficient medical and nursing facilities to serve adequately maternity patients of the lower income groups residing therein. Over two-thirds of the State health departments, either through pro-

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[6] See text footnote [4].

vision of personnel or financial assistance to local communities, furnish some measure of nursing service for home deliveries. Nurses serving in this capacity render actual bedside care to the mother during the various stages of childbirth and attend both the mother and newborn infant for a designated time thereafter.

The practice by State health agencies of furnishing medical care for deliveries was less well developed at the time of this survey than the plan of supplying State nursing assistance to private physicians; only 17 health departments reported administration of medical care programs including attendance at home births. Eight of this group supplied hospital delivery service for complicated or primipara cases, while three additional departments financed hospital—but not home—deliveries. The fee system is customarily employed for reimbursement of physicians who deliver patients where provisions for such service are made. Such fees range in amount from $10.00 to $50.00. A rather unique feature of the Alabama and Florida programs is the State maintenance of a 10- and a 20-bed maternity hospital, respectively. These small hospitals were built as Work Projects Administration enterprises and offer delivery service exclusively.

Besides the delivery service afforded by State health departments, 24 State departments of welfare include in their arrangements for general medical care of the needy the item medical delivery service in the home and/or hospital, while the university hospitals of 19 States also provide free or part-pay hospitalization for maternity cases. Furthermore, in 5 additional States, hospital delivery service is available wholly or partially at State expense through general hospitals administered variously by a board of control, State eleemosynary board, or an independent hospital commission.

Three-fifths of the State health departments own incubators which are loaned to local hospitals, to health officers, or to private physicians for the care of premature infants. Some of these incubators are electrically heated and some are of the hot-water type. They are available for either hospital or home use—throughout the State in most instances, though sometimes for selected areas only. Occasionally, State incubator service is furnished as an educational and promotional measure rather than as a service unit. Under this plan, blueprints are distributed to local hospitals, and the State agency urges that incubators be built locally.

Employment of consultants for service to practicing local physicians in their offices or hospitals is a slightly more prominent feature of State services associated with obstetrics than of those involving pediatrics. Consultant obstetricians are available to private physicians at State expense in 32 jurisdictions, and consultant pediatricians are employed by nearly as many. In some States these consultants are full-time members of the health department staff; in others, they are

retained on either a part-time salary or individual fee basis. While their first responsibility is to render consultation service to local physicians and clinicians regarding individual cases which present complications, those who are employed full time also conduct refresher courses, arrange demonstrations, promote and supervise local clinics, and assist in the general education programs.

While in the strictest sense, follow-up studies of maternal and infant mortality records could scarcely be termed real service, in a broader sense they constitute a control device for the State's service program. Only through knowledge of the leading causes of puerperal and infant mortality can an effective approach be made toward reducing the number of such deaths. Determination of the particular population groups or geographic sections in which there are relatively high rates is essential, also, from the standpoint of selected communities for concentration of service. According to table 2, some analysis of maternal mortality records is reported by more than four-fifths of the State health departments, while nearly all of them make similar studies of infant deaths. These analytical procedures differ considerably in method, of course. Some represent merely gross tabulations, while others include detailed case-by-case investigation.

Although protection of the health of mothers and children is not founded basically upon law enforcement or drafting of regulations, reference to table 2 denotes that in almost all jurisdictions several agencies of State government exercise regulatory control over certain matters which are significant to maternity-child health programs in their broader concepts. More conspicuous among the regulatory measures pertaining to maternity and child health are promulgation and enforcement of rules and regulations for communicable disease control, requirement that serologic tests routinely be made a part of the physical examination of every pregnant woman, and insistence upon the instillation of silver nitrate or other approved preparation in the eyes of every newborn infant. Because of their close association with health problems of a specific nature, these regulatory activities of State health departments have already been treated in detail in previous chapters of this series.[7]

Regulation of midwives, as defined by licensure, was discussed earlier in the present report. In some States, licensure and supervision are required also for maternity hospitals and child-caring institutions. Thirty-one and twenty-five States, respectively, pursue the policy of licensing or registering such establishments, and responsibility is divided between the departments of health and welfare. The position of the department of welfare is much more prominent with respect to custody over child-caring institutions (which may include orphanages, child-boarding homes, and/or day nurseries) than with regard

[7] See text footnote [6] (chapters II, III, and IV).

to control of maternity hospitals. Establishments of the latter classification are more apt to fall within the scope of health department authority. Reference to the situation in 1930 [8] discloses that within the past 10 years there has been a marked tendency to transfer maternity hospital control from the department of welfare to the health department, but that regulation of children's institutions remains almost entirely a welfare department function.

All States, the District of Columbia, and Puerto Rico have enacted legislation which, in varying measures, regulates the conditions under which women and children may be gainfully employed. In nearly all jurisdictions the department of labor or industrial commission is the State agency charged with administering and enforcing these laws. While limitations differ markedly from State to State, conditions which are subjected to regulation most frequently include: For women, employment in certain occupations, maximum number of hours for each working day and each working week, rest periods to be observed, seats in all establishments where women are employed, types of work prohibited at night, and—in a few States—definite periods of leave required for maternity cases; for children, minimum age for employment, age for which school attendance is compulsory, kind of employment permitted outside school hours, maximum number of hours for each working day and each working week, kinds of night work prohibited certain age groups, and requirement that each child shall possess a work permit. Employment certificates for school children, though required by State law, are usually issued by local school authorities.

Over four-fifths of the States require that plans for new school buildings be approved before construction begins. Such approval includes consideration of proper lighting, heating, ventilation, plumbing, sewage disposal facilities, and water supply. The department of education is responsible for this approval singly in 17 States and jointly with the health department in 14. In 8 States the health department alone is charged with this duty, while the department of labor, art commission, or State architect occasionally shares responsibility. Sanitary maintenance of the water supplies and sewage disposal facilities of school premises also has a bearing upon school health. Information regarding the functions of State agencies in school sanitation may be obtained from chapter V.[9]

Occasionally, regulatory authority of the State department of education in the interest of better health for school children also has to do with administering the school health law as it applies to physical examination of school children. This last function, however, is more often a duty of the health department than of the department of educa-

[8] See footnote [1].

[9] See text footnote [4].

tion. State legislation relative to school examinations falls roughly into two broad classifications, "compulsory" and "permissive." Of the two, permissive examinations are authorized more frequently than compulsory ones are imposed.

For children of school age, the school curriculum is prescribed by the State department of education and usually includes definite courses of study in health. These courses commonly result from joint deliberations of the health department and the department of education. Besides imparting knowledge, the health instruction of school children is designed to inculcate habits and attitudes contributory to healthful living and the building of sound bodies.

Another educational approach to improvement of the health of school children is through in-service training given teachers and inclusion of health instruction in the curriculum of teachers' training colleges. Here, again, the health department and the department of education are apt to collaborate in impressing upon teachers and prospective teachers the importance of their position in raising the health standard of the school child. The teacher's opportunity in this respect stems partly from responsibility for presentation of subject matter, but more particularly from close association with the children which permits recognition, in the earliest stages, of symptoms of acute illness, physical defects, and subnormal development.

Health services for school children are administered in a somewhat different fashion from those for younger children. Periodic physical inspection or examination is the framework for correction or improvement of a child's physical defects; yet marked disagreement appears to exist regarding the most efficacious method for obtaining maximum value from such examinations.

Relatively few States encourage annual examination of all school children. Instead, they favor restriction of the number examined, with more concentration upon correction of defects. Furthermore, they urge that parents be present at the time of examination in order that there might be developed a better understanding of any defects found and the importance of securing early correction thereof. In selecting children to be examined, more States utilize the system of choosing certain school grades for examination each year than follow any other plan. Through this selection, each child is reexamined every two or three years, depending upon the interval between the school grades chosen. Another method of selecting school children to be examined is that termed "screening." By this scheme, children of all grades are inspected by a teacher or nurse, and those having noticeable defects are referred to the physician for thorough examination.

The types of school examinations sponsored by the various States range from superficial testing of vision and hearing by teachers or nurses to complete physical examinations by physicians. Reports

from States selected at random for the specific items covered are cited to illustrate types of practice:

Arkansas	Thorough inspection, including vision, hearing, nutrition, and gross defects.
Delaware	Complete physical examination.
Florida	Complete physical examination, including the special senses.
Illinois	General physical examination, including hearing, sight, throat, weight, and respiration.
Indiana	Examination, including sight, hearing, inspection for disease, disabilities, or other defects which may reduce efficiency.
Kentucky	Examination for evidences of communicable diseases, parasitic diseases, and physical defects.
Maryland	Complete physical and dental examinations.
South Carolina	(1) Screening—on basis of head, heart, lungs, etc. (2) General physical examination when indicated.
Vermont	Examination of eyes, ears, nose, throat, heart, lungs, teeth, height, weight, and general nutrition.
Wyoming	Inspection of eyes, ears, and throat by teachers and nurses.

Most State health agencies supervise school medical services to a greater or lesser extent. However, health department subsidy for physical examination of school children is rarely earmarked as such, but is covered by the cooperative health department budget which originates partly from State and partly from local sources. Six departments of education, on the other hand, extend financial aid to local communities for the express purpose of contributing to the support of school medical examinations. Examinations of school children are made directly by State personnel in 20 jurisdictions; in 9 of these, service is rendered by the State for selected areas only, upon request only, or under other special circumstances. In nearly half of the jurisdictions where school examinations are not performed by members of the State staff, a uniform system—promoted by the State—is followed by the constituent subdivisions.

Outstanding among the health problems of school children, as revealed by routine physical examinations, are dental defects, faulty nutrition, defective vision, and impairment of hearing. State health departments—ranging in number from 10 to 28 for the several specific problems—have made special studies pertaining to these defects. In several other States the department of education has initiated similar studies. Investigations dealing with disease incidence and immunization are also related to health problems of school children. Studies of this type were covered in chapter II.[10] Cardiac disease and goiter are less common ailments of school children, but in several States they represent a problem of sufficient magnitude to provoke special consideration.

[10] See text footnote *.

Practically all States, through their aid in expanding general public health nursing services, indirectly assist in providing nursing service to promote and help arrange for correction of physical defects of school children. It must be understood that all phases of State activities for the improvement of school health, like services for younger children and for mothers, are sharply influenced by and closely tied in with local health organization. Even State sponsorship of uniform arrangements within its boundaries frequently does not entail direct service by the State agency. More often than not, for all types of maternity and child hygiene, local personnel render the actual service, while the State staff assists through advice, financial aid, and a general balancing influence. However, within individual States, practices vary in accordance with the resources or the desires of local communities.

EXPENDITURES FOR MATERNITY-CHILD HEALTH ACTIVITIES

As pointed out in each of the preceding chapters,[11] any attempt to isolate complete expenditure figures for a particular health activity is beset with difficulties. Insofar as arriving at the cost of State activities which contribute to the health of mothers and children is concerned, these difficulties are centered in the fact that maternity-child health programs formally organized and budgeted as such do not cover the entire scope of maternity and child health activities. The foregoing sections of this report have delineated numerous methods whereby such official agencies of State government as departments of welfare, education, and labor, State university hospitals, and State general hospitals of other control supplement the maternity and child health services of State health departments. However, for very few of these agencies is it possible to give specifically the cost of such services, because usually contributions to maternity and child health do not represent separate and distinct programs organized as such. For example, the cost to the department of education of maintaining a health curriculum adapted to the course of study of the several school grades is usually an integral part of general education. Furthermore, no separate arrangement is likely to be made for instruction of teachers and teacher-training students in matters pertaining to child and community health. Instead, such health courses or lectures are apt to be included merely as one of several bodies of subject matter covered. Again, environmental hygiene is only one of many considerations in the construction and upkeep of school buildings. In the same manner, departments of welfare, which license maternity hospitals or child-caring and placing agencies and institutions, frequently do so in conjunction with other activities which are not pertinent to the present study. Moreover,

[11] See text footnote 4.

medical delivery service available through State welfare agencies is only one item of broader programs of general medical care for the needy. Likewise, enforcement of labor laws affecting the health of women and children is usually merged with other types of labor control. Finally, maternity clinics operated by State university hospitals for the most part are units of the general out-patient department services.

Within State health departments also there is interlacement of activity insofar as maternity and child health is concerned. Related health department functions which are also significant to the health of mothers and children include broad public health education programs, intramural training of public health personnel, general communicable disease control, tuberculosis control, venereal disease control, dental hygiene, collection and analysis of vital statistics, and laboratory diagnosis. Likewise, along with numerous other health services, maintenance of maternity and child health facilities at the local level is included in the purposes for which financial aid is extended to local health departments by State agencies.

The influence of such general health activities upon maternity and child health is recognized by the United States Children's Bureau, which is responsible for the administration of Federal grants-in-aid to the several States for extension and improvement of maternal and child health services. Such recognition is apparent from the fact that the proportions of State and local funds expended for these service categories which are shown to be for health services to mothers and children are accepted for matching purposes.[12] However, in the prevailing system of accounting, funds are assigned to primary categories of service; thus the exact amount of State money appropriated for general health activities but expended for maternity and child health services is difficult to determine from the financial data collected for the purpose of revising Public Health Bulletin No. 184. At the same time, because the United States Children's Bureau requires that—in order to receive Federal aid under title V of the Social Security Act—State health departments must designate the portion of State money appropriated for general health services but expended for health services which are limited to mothers and children, it was possible to obtain from that source a figure which is believed to be a reliable index for comparing the expenditures of the several State health departments for maternity and child health.

In view of the circumstances set forth, it is obvious that no absolutely complete or accurate figure can be ascertained concerning the amount expended by all State agencies for maternity and child health services. Therefore, it becomes necessary to confine discussion of the cost of State maternity and child health services to the cost of such

[12] See footnote 4

services which are administered and aided by State health departments. Consequently, the fiscal material presented in table 3 represents expenditures of State health departments alone, but includes their outlay for administration, regulation, supervision, actual field service, and financial aid to local communities for health services to mothers and children during the fiscal year 1940. It is recognized, of course, that large sums are expended by other State agencies. For instance, the obstetrical services furnished directly by State university hospitals and indirectly by departments of welfare and the school health services afforded by departments of education undoubtedly all attain sizable proportions. As already stated, however, accounts of these agencies do not lend themselves to break-down of expenditures for health services available to mothers and children exclusively.

In table 3 are recorded not only the approximate gross disbursements of each State health department for maternity and child health during a 12-month period, but also the expenditure per live birth in each jurisdiction. For the Nation as a whole, the aggregate amount reaches more than $6,000,000. This figure covers the operating cost of all services rendered mothers and children by the central and district staffs of State health agencies plus all assistance extended by the State health department to its local counterparts for similar purposes.

Break-down of the figures recorded in table 3, which cover both Federal funds and State money specifically earmarked for maternity and child health, gives the impression that over two-thirds of the full amount expended by State health agencies of the entire country for improving the health of mothers and children was derived from Federal allotments. This seeming overbalance of Federal funds is occasioned by the fact that local funds as well as those appropriated by the State enter into the matching formula of the United States Children's Bureau. Since the present study is restricted to consideration of State activity, however, local contributions form no part of the subject of discussion.

According to table 3, expenditures of individual State health departments for the improvement of maternity and child health range from almost $34,000 in Nevada to over $357,000 in New York. These figures are not particularly meaningful, however, until they are related to the individual problems of the various States. Reduction of total expenditures to a per capita basis also has little significance insofar as maternity and child health activities are concerned, since such programs are not designed to serve the entire population. Consequently, the number of live births occurring in a State was selected as a significant unit for measuring the relative needs for maternity and child health services in the several jurisdictions, despite the fact that these funds are used for health service to children of all ages. This choice was influenced by the fact that number

TABLE 3.—*Approximate total expenditures* and expenditures per live birth by State health departments for maternity and child health activities in each State and Territory, the District of Columbia, and the Virgin Islands during the fiscal year 1939–40*

State or Territory	Approximate total expenditure* for maternity and child health activities	Live births, 1939	Approximate expenditure* per live birth for maternity and child health activities
Total	$6, 172, 600	2, 350, 325	$2 63
Alabama	226, 200	61, 385	3. 68
Arizona	75, 200	10, 928	6 88
Arkansas	129, 800	35, 565	3. 65
California	148, 000	103, 453	1. 43
Colorado	95, 400	20, 692	4. 61
Connecticut	94, 000	23, 463	4. 01
Delaware	53, 200	4, 384	12. 14
District of Columbia	90, 300	14, 037	6. 43
Florida	119, 500	32, 328	3. 70
Georgia	192, 000	64, 781	2. 96
Idaho	60, 800	11, 068	5. 49
Illinois	316, 400	117, 841	2. 68
Indiana	91, 400	58, 349	1. 57
Iowa	120, 200	43, 765	2. 75
Kansas	112, 400	29, 115	3. 86
Kentucky	118, 500	60, 587	1. 96
Louisiana	113, 100	48, 844	2. 32
Maine	80, 700	14, 987	5. 38
Maryland	124, 000	28, 291	4. 38
Massachusetts	153, 100	63, 657	2. 41
Michigan	193, 100	94, 418	2. 05
Minnesota	90, 700	50, 237	1. 81
Mississippi	128, 100	51, 721	2. 48
Missouri	135, 200	58, 876	2. 30
Montana	61, 800	10, 897	5. 67
Nebraska	49, 700	22, 338	2. 22
Nevada	33, 900	1, 940	17. 47
New Hampshire	60, 000	7, 934	7. 56
New Jersey	149, 600	56, 379	2. 65
New Mexico	95, 700	14, 215	6. 73
New York	357, 300	187, 575	1. 90
North Carolina	194, 500	79, 149	2. 46
North Dakota	55, 700	13, 158	4. 23
Ohio	145, 000	109, 272	1. 33
Oklahoma	102, 300	43, 471	2. 35
Oregon	73, 300	16, 715	4. 39
Pennsylvania	254, 700	161, 049	1. 58
Rhode Island	64, 900	10, 444	6. 21
South Carolina	149, 000	42, 811	3. 48
South Dakota	58, 300	11, 616	5. 02
Tennessee	124, 400	53, 353	2. 33
Texas	252, 000	121, 049	2. 08
Utah	76, 300	13, 007	5. 87
Vermont	70, 500	6, 375	11. 06
Virginia	136, 900	52, 921	2. 59
Washington	56, 400	26, 538	2. 13
West Virginia	96, 000	41, 545	2. 31
Wisconsin	153, 400	54, 168	2 83
Wyoming	40, 300	4, 897	8. 23
Alaska	52, 000	1, 514	34. 35
Hawaii	71, 200	9, 392	7. 58
Puerto Rico	76, 200	73, 044	1. 04
Virgin Islands	(a)	787	(a)

*Expenditures for the services considered are those reported by the several State health departments to the United States Children's Bureau as being expended for health services limited to mothers and children under plans approved by the Federal administrative agency. Funds disbursed include Federal grants and money appropriated by State legislative bodies. Financial assistance extended by State health agencies to local health units for maternity and child health services, but not the complete expenditures of political subdivisions for these purposes, are included.

(a) No record of expenditures for maternity and child health as a separate activity.

of live births was made an important factor under the provisions of the Social Security Act for determining the amount of Federal aid to which a State is entitled for carrying out its plan of service to mothers and children.[13]

Neither of the States which mark the extremes in aggregate expenditures occupy terminal positions from the standpoint of expenditures per live birth. By the second unit of measurement, Alaska leads with a disbursement of $34.35 per birth, while Puerto Rico ranks lowest, reporting a corresponding expenditure of $1.04. Thus, even on a relative basis, there is a wide divergence among the States in the amounts expended for maternity and child health services.

Further investigation reveals that the lower figure cited—slightly more than $1.00 per birth—is more typical of the country as a whole than is the higher amount—over $34.00. Expenditures per birth of the middle 50 percent of the States fall within the boundaries of $2.31 and $5.49, while $3.22 represents the median and $2.63 the average investment.

In seeking an explanation of the differences noted, consideration was given to influence of the two State characteristics which have been found to affect fiscal practices in the support of other health services. These two characteristics are wealth, as measured by per capita spendable money income, and location within a particular geographic area (Northeastern, Southern, Central, and Western). Investigation disclosed that, although in general the wealthier 50 percent of the States tend to spend more for maternity and child health than do the poorer half, the financial resources of a State appear to have less conspicuous bearing upon the extent to which it supports maternity and child-health activities than was discernible in other categories of service. This status is only to be expected, inasmuch as the Federal Government contributes a large proportion of the total sum expended for materity and child health services, and the allotment formula utilized is designed to offset, partially at least, the usual adverse effect of low per capita income upon health services. Moreover, the several geographic groupings are characterized by such widely varying internal behavior that whatever differences do exist between expenditures of the median State of each section are believed to reflect the formula used for apportioning Federal aid and not to result from location alone.

Study of the degree to which balancing is effected by the allotment procedure, on a basis of the proportionate number of births occurring in each State, points to a greater outlay per birth for maternity-child health services in States with few births than in those with many. This conclusion is arrived at from arraying the jurisdictions in descending order according to the percentage which the number of live

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[13] See footnote 4.

births in each State is of the total number of live births in the United States, dividing the States thus arrayed into quarters, and computing the expenditure per live birth for the median State of each quarter. The outcome of this test was as follows: Highest quarter, \$2.05; second quarter, \$2.35; third quarter, \$4.23; and lowest quarter, \$7.56. In other words, as the number of births in a State as related to the total number in the country increases, the proportionate expenditure for State maternity and child health services decreases. That this situation still exists in spite of Federal effort to give additional aid to jurisdictions having the greatest problem is an interesting observation which indicates that, while Federal influence may minimize certain differences among the States, it does not wholly counterbalance those differences.

Again it must be emphasized that both the total expenditures cited and the expenditures as related to an index of the relative problems of the various States are measures of State health department activity only and do not include services of local health departments except as they are aided by the State. Consequently, it is not to be construed that the differences among the States represent entirely differences in quantity or quality of service available to the public. They may indicate differences in organization, for in some jurisdictions most of the maternity and child health services are financed by State and Federal funds, while in others the largest expenditures for these services are from local sources.

Repeatedly, throughout this discussion, reference has been made to the growth which has taken place in State maternity and child health programs. Perhaps the most telling evidence of the expansion which has occurred during the past decade lies in the increased amount of money expended. Cursory inspection of total expenditure figures for 1930 (\$1,382,400) [14] and the 1940 total recorded in table 3 (\$6,172,600) suggests that about four and one-half times as much was disbursed during the most recent survey year as during the earlier one. These differences apply to total disbursements, of course, and give no indication of the ratio on a per client basis, since the population base for the two years is not the same. While 1930 money was devoted to care for expectant mothers and infants only, 1940 services were available to maternity cases, infants, preschool, and school children.

Moreover, by carefully weighing the two sets of figures, one finds that they are not entirely comparable—even for aggregate sums—since the earlier publication did not include expenditures of the District of Columbia or the three Territories. Consequently, for the purpose of establishing comparability, it was necessary to restrict the picture of growth to changes in the financial structure of the 48 State health departments, as applied to activities for the improvement of

[14] See footnote [1].

maternity and child health. Such adjustment of the 1940 total does not alter the conclusion that there has been remarkable development in the programs under consideration, for within the 48 State health organizations the annual expenditure has risen from $1,382,400 in 1930 to $5,882,900 in 1940. In other words, from the standpoint of gross expenditures, four and one-fourth times as much money was being disbursed by State health departments for maternity and child hygiene at the end of the 1930-1940 decennary as at the beginning. No determination was made of differences in the amount allotted for each person eligible for service under the two programs.

DISCUSSION

Funds available to State health departments for administration of health services relative to mothers and children have more than quadrupled during the 1930–1940 decade. While a portion of these increased funds are utilized for continuation and expansion of traditional activities, a number of new channels of service have been opened also. Furthermore, the population base which is served has been broadened.

Among the older branches which have undergone further development are operation of prenatal, infant, and preschool clinics; licensing of maternity hospitals and of child-caring or placing institutions and agencies; instruction, supervision, and licensing of midwives; education of the public in matters pertaining to better health for mothers and children; physical examination of school children; and extension of financial aid to local health units for support of maternity-child health services rendered locally.

Items embraced more recently by the broadened State programs include postgraduate education of nurses and physicians in obstetrical and pediatric care; provision of supervision and consultation service to local health units concerning organization of programs at that level; employment of obstetrical and pediatric consultants for service to individual practicing physicians and clinic personnel; analysis of infant and maternal mortality rates for determining the possibilities of reducing such deaths; furnishing free nursing and medical service for home delivery or arranging for free hospital delivery for selected cases; and supplying incubators for use of premature infants. Besides, the population coverage has been extended. Formerly, services were limited to expectant mothers and infants. Now, in addition to pregnant women, the entire child population may be served.

Considerable variation exists in the extent to which the aforementioned services are offered by the several States. Besides, absence of service at the State level does not necessarily reflect upon that State indifference toward the importance of the particular service item. Subsidized local health units may or may not function in lieu of the State agency.

While the health department is the official State agency primarily responsible for activities leading to better health for mothers and children, several other governmental units, particularly the departments of welfare, labor, and education and State university hospitals, also make some contribution to the over-all State plan. For the most part, departments of welfare are concerned with licensure and supervision of child-caring institutions and, through their arrangements for general medical care of the needy, with provision of medical delivery service; departments of education participate in school health work; and hospitals affiliated with State universities offer both in-patient and out-patient services for maternity cases during the complete maternity cycle.

According to the best fiscal data available in 1940, activities for maternity and child health as administered or aided by State health departments were costing over 6 million dollars per year. While it appears that 69 percent of this expense was borne by Federal grants made available under title V of the Social Security Act, this proportion is exaggerated by the fact that significant amounts of local money are also used for matching purposes; however, local participation forms no part of this analysis. Inasmuch as the States are obliged to maintain the basic organizational structure which supports the several public health specialties, even State contribution in reality is much greater than it appears to be when credit is given only for the specialized maternity and child health elements of the program

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SUPERFICIAL VASCULARIZATION OF THE CORNEA

The Result of Riboflavin Therapy [1]

By HAROLD R SANDSTEAD, *Passed Assistant Surgeon, United States Public Health Service*

In 1931, Day, Langston, and O'Brien (*2*) reported the production of a vascularizing keratitis in vitamin G deficient animals. Bessey and Wolbach (*1*) in 1939 again produced a vascularizing keratitis in animals deprived of riboflavin and reported curing the condition by feeding the vitamin. Kruse, Sydenstricker, Sebrell, and Cleckley (*5*, *6*) in January and June 1940 reported that a superficial vascularizing keratitis of the cornea in patients shown to be receiving insufficient riboflavin was cured by the riboflavin and recurred when the vitamin was withdrawn.

In May and November of 1940, Johnson and Eckhardt (*3*, *4*) treated patients with rosacea keratitis with favorable results. Wiehl

[1] From the Division of Public Health Methods, National Institute of Health Submitted for publication April 20, 1942

and Kruse (7) have used superficial vascularization as a sign of riboflavin deficiency in survey work. More recently the Conference on Methods and Procedures for Nutrition Survey (as reported in Public Health Reports, February 6, 1942) stated: "Characteristic capillary invasion of the cornea is an index of riboflavin deficiency, and it is recommended that this examination [slit lamp and biomicroscopic examination] be used in group assessments of the nutritional status."

It is the purpose of this report to present data on (1) the prevalence of superficial vascularization of the cornea in population groups of various sizes, and (2) the effect of riboflavin therapy on that condition.

STUDY GROUPS

In the present survey 366 persons in all were examined [2] and 52 of that number were included in a riboflavin feeding project. All subjects were residents of Hagerstown, Md., or its immediate vicinity. The groups and their major characteristics are as follows:

TABLE 1.—*Groups studied*

Group	Number	Sex		Color	Age range	When surveyed
		Male	Female			
School children (St. Mary's School).	107	55	52	White	7–18	October and November 1941.
Youths (National Youth Administration)	190	29	161	176 White 14 Negro	16–24	July to September 1941.
Adults (National Defense Training School).	57	57		White	17–58	May 1941.
Other adults	12	12		White	29–50	September 1941.

METHOD OF EXAMINATION

All subjects were examined (by binocular corneal microscope, with slit lamp illumination) and, for purposes of recording, each cornea was arbitrarily divided into four quadrants: (1) nasal, (2) superior, (3) temporal, and (4) inferior. In each quadrant, the number of "tiers" of *circulating* capillary loops (serrations) was noted and recorded in terms of the greatest number of tiers visible counting from the limbus centripetally toward the pupil, i.e., 0, 1, 2, 3, or whatever number was seen; central penetration was estimated (in millimeters) and recorded, as was also activity or rate of flow (sluggish, moderate, or rapid). In order to verify the observation, two examiners routinely made independent examinations of all who received therapy, as well as of the majority of the whole survey group. At each examination, the examiners' observations were checked and found to be in close agreement.

[2] Using a binocular corneal microscope (Bausch & Lomb) with slit lamp illumination.

PREVALENCE AND DEGREE OF EXTENSION OF VASCULARIZATION OF THE CORNEA

In table 2 are shown the number and percentage of subjects with the maximum number of tiers of circulating capillary loops (serrations) in any quadrant of either cornea. The observations indicate that 80 to 95 percent of the persons examined have some degree of corneal invasion by capillaries.

The table shows the differences between the groups. Corneal invasion was observed relatively more frequently, in more severe form, i.e., to a greater depth (in terms of the number of tiers of vessels present) in the two older groups than in the school children. The percentage of subjects having no corneal vessels or only a marginal tier in any quadrant of either cornea was: among the parochial school children, 63.5; among NYA youths, 27.9; and among adults of the survey group, 45.2.

TABLE 2.—*Prevalence of vascularized cornea by groups*

	Maximum number of tiers of capillary loops in any quadrant					Total number having corneal vasculari-zation	Total number examined
	0	1	2	3	4 and more		
St. Mary's School:							
Girls—Number	10	25	13	4	....	42	52
Percent	19.2	48.1	25.0	7.7	....	80.8	100.0
Boys—Number	9	24	17	3	2	46	55
Percent	16.4	43.6	30.9	5.45	3.62	83.6	100.0
Total—Number	19	49	30	7	2	88	107
Percent	17.8	45.8	28.0	6.3	1.87	82.2	100.0
National Youth Administration:							
Girls—Number	8	36	81	30	6	153	161
Percent	4.96	22.2	50.3	18.7	3.71	95.04	100.0
Boys—Number	4	5	15	4	1	25	29
Percent	13.8	17.2	51.5	13.8	3.45	86.2	100.0
Total—Number	12	41	96	34	7	178	190
Percent	6.3	21.6	50.5	17.9	3.68	93.7	100.0
National Defense Training School and other adults:							
Males—Number	14	16	27	8	4	55	69
Percent	20.3	23.2	39.1	11.6	5.8	79.7	100.0

One other measure of the degree of involvement of the cornea may be expressed in the number of quadrants of the circumferences of the two corneas invaded by capillaries. Among the parochial school children 67 percent had no more than two quadrants (out of eight) involved; among the National Youth Administration youths 17 percent had as few as two quadrants affected; and among the older group only 30 percent had as few as two quadrants with capillary invasion.

Very generally, the greater the number of quadrants involved the greater the extension of the vessels toward the pupil. Where no more

than two quadrants were involved it was unusual to find more than one tier of vessels; but when seven or eight quadrants were involved it was rare to find fewer than two tiers. This occurred only in the older group.

THERAPY

In order to observe the effect of riboflavin on superficial vascularization of the cornea, two groups of different ages were studied. Segregation of the subjects into control and therapy groups was done by a third person so that the two examiners had no knowledge of an individual's therapy status until after his final examination.

Twenty-four youths who presented varying degrees of capillary invasion of the cornea, as noted at the original survey, were re-examined and divided equally into control and riboflavin feeding groups. Five older male subjects with corneal involvement, having very good economic status, were also placed in the riboflavin feeding group The riboflavin[3] was dispensed in 5-mg. capsules and the control group received placebo capsules. Each subject received written instructions to take one capsule three times daily and was given a recording card which he was to present at his next examination. Therapy was instituted on September 15 and continued for 60 days, with two exceptions in which it was administered for 68 and 110 days. Re-examinations were made at approximately 10-day intervals.

The corneal vascularization of the older subjects who had received 615 to 1,630 mg. of riboflavin for at least 60 days was not significantly different from that of persons of similar age in the control group[4] In both groups there was individual fluctuation in the area and degree of involvement.

Young children attending the parochial school were studied because of the possibility that the poor physical and economic status of the National Youth Administration youths might possibly be influencing factors in the response to the therapy. A group of 22 children were equally divided into therapy and control groups. Riboflavin in 5-mg capsules and control capsules were dispensed at 8:30 a. m. and 3:00 p. m. daily at school and taken at home over the week ends and holidays. After 49 days of therapy the subjects were re-examined. As in the previous project no apparent therapeutic effect was observed.

DISCUSSION

Superficial vascularization of the cornea is extremely prevalent. In the parochial school children studied, only 18 percent were without penetration of vessels beyond the limbus. A marginal tier of one

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[3] Recently purchased from E R Squibb & Co and properly protected from deterioration, 3 separate lots used.

[4] However, in a number of instances, coexisting asymptomatic stomatitis was definitely improved or completely cured in the same course of therapy

capillary loop into one or all quadrants of the cornea was found in 46 percent of this group. In 36 percent of these children, central penetration of two or more tiers of anastomosing capillary loops was seen.

The National Youth Administration subjects were in striking contrast to the school children. Only 6.3 percent were without corneal vascularization; 21.6 percent had one tier of vessels, while 72 percent had two or more anastomosing tiers. Extensive superficial corneal vascularization was found in 4 percent of these youths. The group represents both rural and urban youth of poor economic status.

Slight degrees of invasion of the peripheral portion of the cornea are so prevalent without other ophthalmological evidence of disease that questions of etiology and permanency arise. In several of the exanthems an acute catarrhal conjunctivitis is the rule. Particularly is this true of measles and occasionally the cornea is affected. One may speculate as to the possibility that this group of diseases may account for much of the vascularization seen in childhood.

In the two controlled feeding projects, one of which was by individual school feeding, no significant change in the degree of corneal vascularization occurred which could be ascribed to riboflavin effect. In no instance was there a complete disappearance of the vessels and in several a progression was observed. At the present time, therefore, it seems doubtful that superficial vascularization of the cornea, as observed in this study and as found in the general population (*7*, *8*), should be considered a diagnostic sign of riboflavin deficiency; further controlled investigations along this line should be made.

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PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

October 11–November 7, 1942

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the PUBLIC HEALTH REPORTS under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended November 7, 1942, the number reported for the corresponding period in 1941, and the median number for the years 1937–41.

DISEASES ABOVE MEDIAN PREVALENCE

Influenza.—For the 4 weeks ended November 7 there were 5,404 cases of influenza reported, as compared with 5,009, 3,285, and 3,361 for the corresponding period in 1941, 1940, and 1939, respectively. While the number of cases was only slightly larger than that reported during the corresponding period in 1941, it represented an increase of approximately 60 percent over the 1937–41 median incidence. Each region of the country except the North Central reported an excess over the seasonal expectancy, but the highest incidence was reported from the South Atlantic and West South Central regions. Almost 70 percent of the total cases occurred in three States, viz, Texas (2,026), South Carolina (1,021), and Virginia (676). An increase of this disease is expected at this time of the year; and while so many of the regions reported excesses over the 5-year median, the number of cases was not especially large in any region. However, the presence of influenza is usually reflected in the death rate and the average rate from all causes in large cities for the 4 weeks under consideration was 11.7 per 1,000 population, as compared with 11.0 for the corresponding period in the 3 preceding years.

Meningococcus meningitis.—In relation to preceding years the incidence of meningococcus meningitis continued considerably above the level of 1941 and also above the 1937–41 median level. The number of cases reported for the 4 weeks ended November 7 was 237, as compared with 117, 106, and 135 for the corresponding period in 1941, 1940, and 1939, respectively, and with a median of 135 cases for this period in the years 1937–41. Regions along the Atlantic and the Pacific coasts reported the largest excesses over the seasonal expectancy. States in those regions reporting the largest numbers of cases were: New York (51 cases), Pennsylvania (23), Massachusetts (12), New Jersey (11), Maryland (15), and California (14)—more than one-half of the total cases were reported from those six States. In the East North Central region the incidence was about normal and other regions reported a decline from the 5-year expectancy.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The number of cases (2,484) of diphtheria reported for the 4 weeks ended November 7 was approximately the same as that recorded for the corresponding period in 1941, but it was only about 75 percent of the 1937–41 median incidence. The number of cases occurring in the Pacific region was slightly above the 5-year expectancy, but in all other regions the incidence was relatively low.

Measles.—For the country as a whole the incidence of measles was comparatively low. However, a comparison of geographic regions shows that the disease was unusually high in the New England, Middle Atlantic, Mountain, and Pacific regions; in the New England and Pacific regions the numbers of cases were approximately double the median figures, with minor increases in the other two regions. In other regions the disease was less prevalent than in previous years.

Poliomyelitis.—There were 600 cases of this disease reported for the current 4-week period, as compared with 1,320, 1,789 and 1,163 cases reported for the corresponding period in 1941, 1940, and 1939, respectively. Compared with the 1937–41 median incidence, the number of cases for the country as a whole was relatively low, and a similar situation existed in each geographic region except the New England and West South Central. In the New England region the excess over the median was slight, but in the West South Central region the number of cases (64) represented an excess over the 5-year expectancy of approximately 30 percent.

Scarlet fever.—The expected seasonal increase of scarlet fever appeared in all sections of the country during the current 4-week period. The number of cases (8,900) was about 22 percent higher than the 1941 figure, but it was slightly less than the median figure (9,382) for this period. Significant increases over the seasonal expectancy were reported from the New England, South Atlantic, and Pacific regions, with minor excesses in the South Central regions; in other regions the incidence was relatively low.

Smallpox.—The downward trend of this disease that has been in progress since 1938 was interrupted during the current period by the occurrence of 45 cases, as compared with 36 for the corresponding period in 1941. For the first time since about the middle of 1938 the number of cases for a current 4-week period is higher than it was during the corresponding period in the preceding year. The current increase was largely due to an excess of cases in the West North Central region (14 cases as compared with 7 in 1941) and the South Atlantic region (8 cases as against none last year). While the number of cases for the country as a whole was higher than that of last year, it was less than 40 percent of the 1937–41 median incidence for this period.

Typhoid and paratyphoid fever.—The number of cases of typhoid and paratyphoid fever declined considerably during the 4 weeks ended November 7. Compared with preceding years the incidence (599 cases) was about 30 percent less than that of last year and about 45 percent less than the 1937–41 median incidence for the same weeks. The situation was favorable in practically all sections of the country.

Whooping cough.—The incidence of whooping cough was also below the normal seasonal level, approximately 11,000 cases being reported for the current 4-week period, as compared with an average of approximately 12,000 cases for the same weeks in 1938–41. The incidence was unusually high in the North Atlantic, West North Central, and West South Central regions, about normal in the Pacific region, and considerably below the 5-year median in other regions.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ended November 7, based on data received from the Bureau of the Census, was 11.7 per 1,000 population (annual basis), as compared with 11.0 for the corresponding period in the 3 preceding years. The first sign of an unusual increase in the death rate appeared during the week ended October 3, when the rate rose from 10.7 during the preceding week to 11.5 during the week ended October 3 and to 12.2 for the week ended October 10. For the 4 subsequent weeks the rates were 11.6, 11.7, 12.0, and 11.6, respectively. The relatively high death rates during the past few weeks has no doubt been mostly due to respiratory diseases, and while the rate for the week ended November 7 was almost down to the level of October 3, it may be only temporary, as an increase of influenza and pneumonia cases is normally expected at this season of the year, and it is apparent that the presence of these diseases greatly affects the death rate.

Number of reported Cases of 9 communicable diseases in the United States during the 4-week period October 11–November 7, 1942, the number for the corresponding period in 1941, and the median number of cases reported for the corresponding period, 1937–41

Division	Current period	1941	5-year median	Current period	1941	5-year median	Current period	1941	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	2,484	2,480	3,219	5,404	5,009	3,361	5,283	5,194	5,410
New England	24	18	31	25	7	7	1,125	725	583
Middle Atlantic	136	132	215	75	42	50	926	862	862
East North Central	265	238	410	214	187	224	651	702	702
West North Central	117	117	131	50	54	54	297	352	381
South Atlantic	946	1,038	1,305	1,874	1,499	1,456	111	885	580
East South Central	363	355	489	293	117	241	80	282	190
West South Central	432	449	449	2,250	2,482	1,005	93	218	128
Mountain	73	57	95	448	395	359	745	536	516
Pacific	128	76	106	175	226	124	1,255	632	632
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	237	117	135	600	1,320	1,163	8,900	7,318	9,382
New England	31	12	8	34	70	29	883	611	456
Middle Atlantic	85	23	27	99	432	122	1,382	1,078	1,545
East North Central	27	17	25	130	223	215	2,347	1,983	2,866
West North Central	7	9	11	109	83	170	1,039	792	1,147
South Atlantic	39	26	26	38	197	69	1,434	1,117	1,216
East South Central	16	15	20	34	195	58	756	750	725
West South Central	5	8	10	64	50	49	355	241	350
Mountain	1	1	3	19	17	40	196	257	377
Pacific	26	6	7	73	53	100	528	489	441
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	45	36	119	599	847	1,096	10,795	12,053	[3] 12,265
New England	0	0	0	30	24	25	1,849	926	1,000
Middle Atlantic	0	0	0	77	120	132	3,357	2,856	3,114
East North Central	4	13	36	129	95	124	2,782	3,931	3,794
West North Central	14	7	29	20	59	67	1,446	684	608
South Atlantic	8	0	0	120	225	221	857	1,194	1,162
East South Central	2	5	6	63	128	134	291	528	463
West South Central	9	7	9	99	119	195	529	387	359
Mountain	2	2	19	42	47	70	292	508	367
Pacific	6	2	19	19	30	52	892	1,039	876

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.
[2] Mississippi excluded.
[3] Four years (1938–41) only.

DEATHS DURING WEEK ENDED NOVEMBER 14, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov. 14, 1942	Corresponding week 1941
Data from 88 cities of the United States:		
Total deaths	8,593	8,276
Average for 3 prior years	8,206	
Total deaths, first 45 weeks of year	375,670	374,796
Deaths per 1,000 population, first 45 weeks of year, annual rate	11.7	11.6
Deaths under 1 year of age	615	545
Average for 3 prior years	524	
Deaths under 1 year of age, first 45 weeks of year	25,977	23,767
Data from industrial insurance companies:		
Policies in force	65,244,143	64,642,665
Number of death claims	10,393	9,699
Death claims per 1,000 policies in force, annual rate	8.3	7.8
Death claims per 1,000 policies, first 45 weeks of year, annual rate	9.1	9.4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED NOVEMBER 21, 1942

Summary

The incidence of meningococcus meningitis continues above the 5-year (1937–41) median expectancy and above that for any other year since 1937. The cases reported currently were distributed throughout all geographic areas. Decreases were reported for the New England and Middle Atlantic States, where the highest rates have been recorded for recent weeks, and increases were shown in North Central, East South Central and Mountain States, which previously have recorded the lowest rates.

A break in the normal seasonal decline of poliomyelitis occurred during the weeks ended November 14 and 21, due in large part to the numbers of cases reported in Texas and California. In July, Los Angeles reported only 1 case, in August 5 cases, in October 27 cases, and up to November 21, 17 cases have been reported in the city, 13 of which occurred during the week ended November 21.

The number of cases of influenza increased from 1,596 for the preceding week to 1,769 for the current week, more than 75 percent of which occurred in the West South Central and South Atlantic States. The largest numbers of cases were reported in Texas (553), South Carolina (439), and Virginia (157).

With the exception of measles and meningococcus meningitis, the total number of cases reported to date is below the 5-year (1937–41) median for each of the 9 communicable diseases included in the following table for which comparable data are available for prior years.

Other diseases reported during the week include 1 case of anthrax (in Pennsylvania), 1 case of leprosy (in New York), 9 cases of smallpox, 12 cases of tularemia, and 91 cases of endemic typhus fever (31 in Texas and 28 in Georgia).

The death rate for the current week for 88 large cities in the United States is 12.7 per 1,000 population, as compared with 12.0 for the preceding week, and a 3-year (1939–41) average of 11.4 for the corresponding week. During the current week, increased rates were noted for the New England and Middle Atlantic areas while a decrease was recorded for the Pacific States.

Telegraphic morbidity reports from State health officers for the week ended November 21, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Nov. 21, 1942	Nov. 22, 1941		Nov. 21, 1942	Nov. 22, 1941		Nov. 21, 1942	Nov. 22, 1941		Nov. 21, 1942	Nov. 22, 1941	
NEW ENG.												
Maine	1	0	1	1	------	1	5	142	46	1	0	0
New Hampshire	0	1	0	------	2	------	30	17	4	0	0	0
Vermont	0	0	0	------	------	------	120	1	12	0	0	0
Massachusetts	1	5	5	------	------	------	261	108	177	4	3	1
Rhode Island	1	4	0	------	------	------	0	3	2	2	0	0
Connecticut	2	0	0	3	------	3	72	65	45	0	1	1
MID. ATL.												
New York	13	14	19	[1] 16	[1] 7	[1] 11	207	136	149	12	7	3
New Jersey	4	2	13	4	4	7	20	15	18	1	1	1
Pennsylvania	14	12	33	------	------	------	447	332	332	2	3	3
E. NO. CEN.												
Ohio	14	22	46	3	9	9	21	28	28	3	1	0
Indiana	11	13	17	22	32	7	16	17	18	0	0	0
Illinois	26	30	39	9	6	10	33	30	32	1	4	4
Michigan [2]	9	7	12	6	1	------	49	50	78	5	0	0
Wisconsin	2	5	2	28	17	28	66	157	98	0	0	0
W. NO. CEN.												
Minnesota	3	0	1	------	1	1	1	10	59	0	0	0
Iowa	4	7	4	4	1	1	28	18	18	0	0	0
Missouri	12	10	15	------	12	4	8	13	9	0	0	1
North Dakota	2	0	1	2	------	4	1	18	5	1	0	0
South Dakota	3	1	1	------	------	------	19	1	1	0	0	0
Nebraska	2	7	2	8	------	------	50	5	2	0	0	0
Kansas	8	6	6	1	1	1	28	66	19	2	0	0
SO. ATL.												
Delaware	0	1	1	------	------	------	1	1	1	1	0	0
Maryland [3]	17	29	14	4	4	5	21	52	4	3	0	0
Dist. of Col.	0	0	2	2	------	------	1	2	2	0	0	0
Virginia	25	51	51	157	157	118	6	102	48	3	0	2
West Virginia	9	10	12	25	13	13	4	76	17	0	0	0
North Carolina	49	60	80	9	5	5	2	165	165	0	1	1
South Carolina	28	23	16	439	291	284	5	8	5	1	0	0
Georgia	25	21	21	35	59	31	8	21	9	2	1	1
Florida	16	8	9	3	------	3	5	9	9	0	0	1
E. SO. CEN.												
Kentucky	12	17	17	7	3	10	19	36	36	1	0	1
Tennessee	15	31	31	28	31	38	15	37	13	4	1	1
Alabama	15	39	33	53	66	66	2	9	9	1	0	2
Mississippi [3]	10	15	14	------	------	------	------	------	------	1	1	0
W. SO. CEN.												
Arkansas	11	29	23	53	128	62	8	66	8	1	1	1
Louisiana	13	7	9	10	11	6	3	2	1	1	0	1
Oklahoma	17	18	18	65	113	38	2	24	5	1	0	0
Texas	58	76	61	553	1,295	237	7	112	14	0	2	1
MOUNTAIN												
Montana	2	4	2	------	7	5	7	26	23	0	0	0
Idaho	1	6	0	1	8	------	19	6	6	3	0	0
Wyoming	0	0	0	31	2	------	14	0	0	0	0	0
Colorado	14	13	7	39	17	13	7	108	26	0	0	0
New Mexico	1	4	4	1	------	1	8	19	14	0	0	0
Arizona	1	4	4	84	105	105	8	29	3	0	0	0
Utah [3]	0	2	2	------	7	6	188	25	17	0	1	0
Nevada	0	1	------	------	------	------	5	3	------	0	0	------
PACIFIC												
Washington	0	1	2	------	------	------	408	10	15	1	0	0
Oregon	0	1	2	17	9	18	189	26	19	0	0	0
California	22	25	32	46	45	34	39	259	162	6	1	1
Total	493	642	802	1,769	2,469	1,832	2,483	2,464	2,708	64	29	29
46 weeks	13 452	14,244	20,295	94,687	506,658	179,196	480,688	840,068	359,527	3,103	1,796	1,796

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 21, 1942, and comparison with corresponding week of 1941 and 5-year median—Continued

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Nov. 21, 1942	Nov. 22, 1941		Nov. 21, 1942	Nov. 22, 1941		Nov. 21, 1942	Nov. 22, 1941		Nov. 21, 1942	Nov. 22, 1941	
NEW ENG.												
Maine	0	2	0	9	17	9	0	0	0	1	0	1
New Hampshire	0	2	0	4	14	7	0	0	0	1	0	0
Vermont	1	0	0	3	7	7	0	0	0	0	0	0
Massachusetts	1	4	2	245	170	119	0	0	0	0	2	2
Rhode Island	0	0	0	12	14	5	0	0	0	0	0	0
Connecticut	0	2	0	38	20	35	0	0	0	0	2	2
MID. ATL.												
New York	2	15	7	240	216	236	0	0	0	8	6	6
New Jersey	3	3	2	39	86	85	0	0	0	3	1	2
Pennsylvania	2	16	4	136	210	312	0	0	0	4	7	10
E. NO. CEN.												
Ohio	0	8	7	169	137	225	0	1	1	2	9	9
Indiana	1	4	1	53	105	139	2	1	1	1	2	2
Illinois	11	5	5	162	160	287	0	2	2	3	3	8
Michigan [2]	1	8	6	93	115	287	0	1	9	2	1	2
Wisconsin	2	3	3	204	111	117	1	0	2	0	1	1
W. NO. CEN.												
Minnesota	3	8	4	47	50	84	0	1	6	2	0	0
Iowa	1	0	4	51	33	70	0	1	3	5	2	2
Missouri	3	3	3	64	80	80	0	1	2	0	4	4
North Dakota	0	0	0	11	3	24	0	0	0	0	0	0
South Dakota	0	1	1	16	33	33	0	0	0	0	0	0
Nebraska	4	0	3	15	16	17	1	0	0	0	1	1
Kansas	2	2	2	83	70	91	0	1	1	2	1	1
SO. ATL.												
Delaware	0	0	0	10	15	9	0	0	0	0	2	2
Maryland [3]	0	4	1	25	43	43	0	0	0	3	2	4
Dist. of Col.	0	1	0	13	14	10	0	0	0	0	0	0
Virginia	0	2	2	84	68	55	0	0	0	1	6	6
West Virginia	1	0	0	45	68	81	0	1	0	0	5	6
North Carolina	0	3	2	55	89	78	0	0	0	2	1	2
South Carolina	2	0	0	21	10	12	0	1	0	2	1	2
Georgia	1	1	1	57	49	38	0	1	0	3	5	5
Florida	3	2	1	9	7	7	0	0	0	1	1	3
E. SO. CEN.												
Kentucky	4	3	3	56	85	85	1	0	0	3	6	6
Tennessee	2	28	1	68	125	91	0	0	1	10	11	4
Alabama	0	9	3	33	51	35	0	0	0	1	0	2
Mississippi [2]	3	4	2	43	21	17	0	0	0	5	4	3
W. SO. CEN.												
Arkansas	0	1	1	22	11	20	1	0	1	4	13	10
Louisiana	0	0	0	10	7	14	0	0	0	8	3	7
Oklahoma	0	1	1	20	23	23	0	0	2	0	4	5
Texas	14	1	1	62	93	93	0	0	0	5	6	14
MOUNTAIN												
Montana	0	1	0	8	28	28	0	1	1	1	0	1
Idaho	1	2	1	8	1	11	1	0	0	1	0	2
Wyoming	0	0	0	5	5	5	0	0	0	0	0	0
Colorado	2	1	1	36	25	31	1	0	1	2	4	2
New Mexico	0	0	0	10	7	11	1	0	0	4	7	5
Arizona	0	1	0	5	2	5	0	0	0	1	1	1
Utah [2]	0	0	1	19	8	12	0	0	0	0	0	1
Nevada	0	0	------	0	1	------	0	0		0	0	------
PACIFIC												
Washington	3	1	1	24	21	36	0	0	1	1	1	3
Oregon	4	3	3	16	4	24	0	0	0	0	0	2
California	23	3	5	146	94	179	0	1	1	2	1	9
Total	100	158	158	2,634	2,642	3,571	9	14	61	94	126	196
46 weeks	3,833	8,688	8,688	110,559	110,079	140,753	707	1,242	9,062	6,304	7,880	11,922

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 21, 1942, and comparison with corresponding week of 1941 and 5-year median—Continued

Division and State	Whooping cough, Week ended Nov. 21, 1942	Whooping cough, Week ended Nov. 22, 1941	Week ended November 21, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mountain spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	65	23	0	0	0	0	1	0	0	0	0
New Hampshire	1	0	0	0	0	0	0	0	0	0	0
Vermont	40	12	0	0	0	0	0	0	0	0	0
Massachusetts	285	134	0	0	2	0	0	0	0	0	0
Rhode Island	4	35	0	0	0	0	0	0	0	0	0
Connecticut	107	73	0	0	0	0	1	0	0	0	0
MID. ATL.											
New York	581	474	0	1	13	0	0	1	0	0	1
New Jersey	186	226	0	0	0	0	0	0	0	0	0
Pennsylvania	305	223	1	0	1	0	0	0	0	1	0
E. NO. CEN.											0
Ohio	180	235	0	0	0	0	0	0	0	0	0
Indiana	28	41	0	0	0	2	0	0	0	1	0
Illinois	198	237	0	3	1	0	3	0	0	1	0
Michigan [3]	263	279	0	0	12	0	0	0	0	0	1
Wisconsin	199	338	0	0	0	0	1	0	0	1	0
W. NO. CEN.											
Minnesota	54	56	0	5	0	0	0	0	0	0	0
Iowa	17	26	0	0	0	0	0	0	0	2	0
Missouri	5	21	0	0	0	0	1	0	0	0	0
North Dakota	10	9	0	0	0	0	0	0	0	0	0
South Dakota	5	3	0	0	0	0	0	0	0	0	0
Nebraska	7	9	0	0	0	0	0	0	0	0	0
Kansas	67	87	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	3	2	0	0	0	0	0	0	0	0	0
Maryland [3]	116	27	0	0	0	0	0	0	0	0	0
Dist. of Col	19	14	0	0	0	0	0	0	0	0	0
Virginia	36	51	0	0	0	24	0	0	0	0	0
West Virginia	25	9	0	0	0	0	0	0	0	0	0
North Carolina	60	102	0	0	0	0	0	0	0	0	0
South Carolina	31	22	0	0	2	0	0	0	0	0	7
Georgia	16	15	0	4	5	0	0	0	0	0	28
Florida	11	9	0	2	0	0	0	0	0	0	4
E. SO. CEN.											
Kentucky	78	124	0	0	2	0	1	0	0	2	0
Tennessee	43	26	0	1	0	1	0	0	0	0	8
Alabama	13	30	0	0	0	0	0	0	0	0	7
Mississippi [2]			0	0	0	0	0	0	0	0	1
W. SO. CEN.											
Arkansas	7	15	0	2	12	0	0	0	0	1	0
Louisiana	0	3	0	2	1	0	0	0	0	0	2
Oklahoma	15	18	0	0	0	0	0	0	0	0	0
Texas	162	102	0	3	107	0	0	0	0	0	31
MOUNTAIN											
Montana	16	27	0	0	0	0	0	0	0	0	0
Idaho	5	2	0	0	0	0	0	0	0	0	0
Wyoming	4	9	0	0	0	0	0	0	0	0	0
Colorado	23	42	0	0	0	0	1	0	0	1	0
New Mexico	27	25	0	0	0	0	0	0	0	0	0
Arizona	1	10	0	0	0	10	0	0	0	0	0
Utah [2]	18	20	0	0	0	0	1	0	0	0	0
Nevada	0	9	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	11	116	0	0	0	0	0	0	0	0	0
Oregon	18	33	0	0	0	0	0	0	0	0	0
California	235	152	0	2	10	0	0	0	0	2	1
Total	3,600	3,555	1	25	168	37	10	1	0	12	91
46 weeks	159,129	187,724									

[1] New York City only. [2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended November 7, 1942

This table lists the reports from 88 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga.	2	0	16	1	1	1	6	0	5	0	0	5
Baltimore, Md.	0	0	3	1	1	2	13	0	13	0	2	62
Billings, Mont.	0	0		0	0	0	1	0	2	0	0	3
Birmingham, Ala.	0	0	2	0	1	0	4	0	5	0	0	0
Boise, Idaho	0	0		0	0	0	0	0	0	0	0	0
Boston, Mass.	3	0		0	4	2	6	1	66	0	0	40
Bridgeport, Conn.	0	0		0	0	0	2	1	2	0	0	7
Brunswick, Ga.	0	0		0	0	0	0	0	0	0	0	2
Buffalo, N. Y.	0	0		0	22	0	12	0	5	0	0	10
Camden, N. J.	0	0		0	0	0	2	0	1	0	0	13
Charleston, S. C.	1	0	4	0	0	0	0	0	0	0	0	0
Charleston, W. Va.	0	0		0	0	0	0	0	1	0	0	0
Chicago, Ill.	13	0	1	2	12	0	26	5	50	0	0	60
Cleveland, Ohio	2	0	2	0	2	0	5	0	39	0	1	46
Columbus, Ohio	0	0	3	3	0	0	4	0	28	0	0	8
Concord, N. H.	0	0		0	0	0	2	1	0	0	0	0
Cumberland, Md.	0	0		0	0	0	1	0	0	0	0	0
Dallas, Tex.	2	0		0	0	0	4	0	4	0	0	3
Denver, Colo.	5	0	22	0	3	0	4	0	6	0	0	2
Detroit, Mich.	0	0		0	21	0	9	1	22	0	0	82
Duluth, Minn.	0	0		0	0	0	0	0	0	0	0	5
Fall River, Mass.	0	0		0	0	0	1	0	3	0	0	6
Fargo, N. Dak.	0	0		0	0	1	0	0	1	0	0	0
Flint, Mich.	2	0		0	1	0	5	0	4	0	1	12
Fort Wayne, Ind.	0	0		0	0	1	5	0	0	0	0	0
Frederick, Md.	0	0		0	0	0	1	0	0	0	0	0
Galveston, Tex.	1	0		0	0	0	1	0	0	0	0	0
Grand Rapids, Mich.	0	0		1	0	0	0	0	2	0	0	5
Great Falls, Mont.	0	0		0	0	0	1	0	0	1	0	0
Hartford, Conn.	0	0		0	0	0	3	1	2	0	0	7
Helena, Mont.	0	0		0	0	0	0	0	1	0	0	0
Houston, Tex.	0	0		0	0	0	2	0	2	0	1	2
Indianapolis, Ind.	1	0		0	3	0	5	0	11	0	0	14
Kansas City, Mo.	0	0		1	2	0	5	0	17	0	0	3
Kenosha, Wis.	0	0		0	0	0	0	0	4	0	0	0
Little Rock, Ark.	0	0	2	1	0	0	1	0	1	0	0	1
Los Angeles, Calif.	5	0	5	1	10	1	15	2	19	0	0	29
Lynchburg, Va.	2	0		0	0	0	1	0	0	0	0	0
Memphis, Tenn.	1	0	4	0	0	0	2	0	3	0	0	7
Milwaukee, Wis.	0	0		0	38	1	1	0	43	0	0	35
Minneapolis, Minn.	0	0		0	0	1	4	1	18	0	0	8
Missoula, Mont.	0	0		0	0	0	0	0	1	0	0	0
Mobile, Ala.	1	0	1	0	0	0	1	0	0	0	0	0
Nashville, Tenn.	1	0		0	0	0	3	0	8	0	0	0
Newark, N. J.	0	0	1	0	3	3	7	0	8	0	0	11
New Haven, Conn.	0	0	2	0	1	0	0	0	5	0	0	18
New Orleans, La.	1	0	2	2	0	0	8	0	1	0	0	2
New York, N. Y.	9	1	9	2	10	8	44	3	94	0	3	112
Omaha, Nebr.	1	0		0	0	0	4	0	3	0	0	0
Philadelphia, Pa.	1	1	2	1	135	1	16	1	44	0	0	185
Pittsburgh, Pa.	2	0	1	0	3	3	6	0	7	0	0	27
Portland, Maine	0	0		0	0	1	3	3	1	0	0	7
Providence, R. I.	1	0		0	0	1	4	0	1	0	1	28
Pueblo, Colo.	0	0		0	1	0	1	0	1	0	0	0
Racine, Wis.	0	0		0	1	0	0	0	4	0	0	1
Raleigh, N. C.	0	0		0	1	0	0	0	0	0	0	9
Reading, Pa.	0	0	2	0	0	0	2	0	0	0	0	5
Richmond, Va.	0	0	1	1	0	0	2	0	2	0	0	6

City reports for week ended November 7, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va	0	0	------	0	0	0	2	0	0	0	0	0
Rochester, N. Y	0	0	------	0	2	0	1	1	6	0	0	13
Sacramento, Calif	10	1	------	0	0	0	2	0	5	0	0	4
Saint Joseph, Mo	0	0	------	0	0	0	3	0	1	0	0	0
Saint Louis, Mo	1	0	------	0	4	0	8	2	18	0	0	6
Saint Paul, Minn	0	0	------	2	0	0	6	0	8	0	0	23
Salt Lake City, Utah	0	0	------	1	57	0	1	0	5	0	0	2
San Antonio, Texas	1	0	------	1	0	0	5	0	1	0	0	1
San Francisco, Calif	1	0	1	0	11	0	7	0	8	0	0	6
Savannah, Ga	0	0	1	1	0	0	0	0	1	0	0	1
Seattle, Wash	1	0	------	0	6	0	1	0	3	0	0	6
Shreveport, La	1	0	------	0	0	0	3	0	1	0	1	0
South Bend, Ind	0	0	------	0	0	0	0	0	2	0	0	1
Spokane, Wash	2	0	2	2	5	1	0	1	2	0	0	1
Springfield, Ill	0	0	------	0	0	0	0	0	1	0	0	12
Springfield, Mass	0	0	------	0	5	0	2	0	37	0	0	3
Superior, Wis	0	0	------	0	1	0	2	0	0	0	0	4
Syracuse, N. Y	0	0	------	0	2	0	3	0	1	0	0	20
Tacoma, Wash	0	0	------	0	30	0	4	0	1	0	0	0
Tampa, Fla	1	0	------	0	0	0	0	0	2	0	0	1
Terre Haute, Ind	0	0	------	0	0	0	0	0	1	0	0	0
Topeka, Kans	0	0	------	0	0	0	1	0	1	0	0	0
Trenton, N. J	0	0	1	0	1	0	1	0	4	0	0	0
Washington, D. C	1	0	1	0	0	1	7	0	14	0	0	7
Wheeling, W. Va	0	0	------	0	0	0	2	0	1	0	0	7
Wichita, Kans	0	0	------	0	1	0	0	0	2	0	0	6
Wilmington, Del	0	0	------	0	0	0	3	0	1	0	0	3
Wilmington, N. C	2	0	------	0	0	0	1	1	2	0	0	1
Winston-Salem, N. C	2	0	------	0	0	0	0	0	3	0	0	4
Worcester, Mass	0	0	------	0	1	0	5	0	12	0	1	5

Anthrax—Cases: Wilmington, Del., 1.

Dysentery, amebic—Cases: Baltimore, 3; Detroit, 1; New York, 1.

Dysentery, bacillary—Cases: Baltimore, 4; Charleston, S. C., 2; Detroit, 2; Fall River, 2; Los Angeles, 4; New Haven, 1; New York, 7; Rochester, 2; Saint Louis, 1; Shreveport, 2; San Francisco, 1.

Leprosy—Cases: New Orleans, 1.

Rocky Mountain spotted fever—Cases: San Francisco, 1.

Typhus fever—Cases: Charleston, S. C., 2; Los Angeles, 1; Savannah, 5; Tampa, 1.

Rates (annual basis) per 100,000 population for the group of 88 cities included in the preceding table (estimated population, 1942, 33,667,679)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Week ended Nov. 7, 1942	12.39	14.09	3.72	62.26	50.33	109.03	0.15	1.70	150.23
Average for week 1937–41	19.10	13.93	[1] 2.96	[2] 84.54	[1] 48.31	103.33	0.63	5.01	160.79

[1] 3-year average, 1939–41.
[2] Median

PLAGUE INFECTION IN CALIFORNIA

Under dates of November 9 and 12, 1942, plague infection was reported found in pools of fleas and lice and one tick from rodents and a jack rabbit collected in California as follows:

Alameda County: September 19, 70 fleas from 9 ground squirrels, *C. beecheyi*, taken 2 miles south of Pleasanton.

Alpine County: September 15, 23 fleas from 24 chipmunks, *Eutamias* sp., and 25 fleas from 4 wood rats, *Neotoma* sp., taken from Crystal Springs Public Camp, 1 mile west of Woodford.

Kern County: August 5, 200 fleas from 9 ground squirrels, *C. beecheyi*, taken 2 miles east of Lebec.

Los Angeles County: July 28, 1 tick from 1 jack rabbit, *Lepus* sp., taken 9 miles west of Fairmont.

Marin County.—Camp Mendell: September 16, 44 fleas from 9 rats, *Rattus norvegicus;* September 17, 56 fleas from 10 rats, same species, and 48 fleas from 12 mice, *Mus californicus* and *Peromyscus truei;* September 18, 20 fleas from 6 rats, *Rattus norvegicus*. Fort Cronkhite: September 15, 5 fleas from 3 mice, *Mus californicus;* September 16, 32 fleas from 14 mice, same species, and 6 fleas from 17 rats *Rattus norvegicus;* September 17, 71 fleas from 27 mice, *Mus californicus* and *Peromyscus truei*, and 19 fleas from 7 mice, *Mus californicus;* September 18, 55 fleas from 23 mice, same species. Fort Baker: September 16, 17 fleas from 4 rats, *Rattus norvegicus;* September 17, 28 lice from 3 rats, same species.

Mono County: September 8, 18 fleas from 23 chipmunks, *Eutamias* sp., taken one-half mile east of Mammoth Post Office.

Siskiyou County: June 3, 71 fleas from 7 ground squirrels, *C. douglasii*, taken 4 miles north of Montague; June 4, 63 fleas from 8 golden mantled squirrels, *C. lateralis*, taken 22 miles northeast of Weed near Grass Lake; September 16, 83 fleas from 5 ground squirrels, *C. douglasii*, taken 3½ miles south of Grenada; September 18, 204 fleas from 10 ground squirrels, same species, taken one-quarter mile south of Edgewood.

Ventura County: September 1, 190 fleas from 12 ground squirrels, *C. beecheyi*, taken 1 mile north of Seacliff and 8 miles west of Ventura.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—Two rats found during the week ended October 24, 1942, and one rat found during the week ended October 31, 1942, all in Paauhau area, Hamakua District, Island of Hawaii, T. H., have been proved positive for plague.

FOREIGN REPORTS

BRITISH EAST AFRICA

Tanganyika Territory—Cerebrospinal meningitis.—Cerebrospinal meningitis has been reported in Tanganyika Territory, British East Africa, as follows: during the week ended October 3, 1942, 288 cases with 37 deaths; week ended October 10, 139 cases, 15 deaths; week ended October 17, 439 cases, 74 deaths.

CANADA

Provinces—Communicable diseases—Week ended October 24, 1942.—During the week ended October 24, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	1	1		6	4	1		1		14
Chickenpox		8	1	154	169	88	39	3	65	527
Diphtheria		9	4	57		11			1	82
Dysentery				16						16
German measles				68	5		2	2	2	79
Influenza		9			10				6	25
Measles		1		120	79	2	19		2	223
Mumps		32	4	138	214	10	43	55	187	683
Pneumonia		2			11				11	24
Poliomyelitis		2		4	2	5	2		3	18
Scarlet fever		8	12	153	90	7	25	50	57	402
Tuberculosis	1	5	15	110	78	17		11	1	238
Typhoid and paratyphoid fever		2		24	6			1	1	34
Undulant fever				1	1					2
Whooping cough		8	1	224	83	21	8	17	19	381
Other communicable diseases		3		3	277	1	2	1	7	294

CHILE

Santiago—Cerebrospinal meningitis.—According to information dated October 27, 1942, the epidemic of cerebrospinal meningitis in Santiago, Chile, apparently reached its peak during the week ended September 5, 1942. Since that time the weekly numbers of new cases and deaths reported have steadily decreased. The following table shows the numbers of cases and deaths reported by weeks:

Week ended—	Cases	Deaths	Week ended—	Cases	Deaths
Previously reported, 1942, to August 15	1,451	208	September 26	193	20
August 22	238	43	October 3	209	50
August 29	206	21	October 10	155	10
September 5	273	47	October 17	111	21
September 12	208	25	Total	3,261	479
September 19	217	34			

CUBA

Provinces—Notifiable diseases—4 weeks ended October 10, 1942.—During the 4 weeks ended October 10, 1942, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer			1	13		10	24
Chickenpox				1	1		2
Diphtheria	2	17	3	2		2	26
Hookworm disease		12		1			13
Leprosy				2			2
Malaria	85	6	1	53	4	229	378
Measles	2	4			3	10	19
Poliomyelitis	10	28	8	11	23	9	89
Tetanus, infantile	1						1
Tuberculosis	11	65	11	34	20	62	203
Typhoid fever	6	39	5	55	8	28	141

[1] Includes the city of Habana.

SWEDEN

Notifiable diseases—September 1942.—During the month of September 1942, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	8	Poliomyelitis	155
Diphtheria	79	Scarlet fever	1,622
Dysentery	235	Syphilis	52
Epidemic encephalitis	3	Typhoid fever	15
Gonorrhea	1,552	Undulant fever	6
Hepatitis, epidemic	453	Weil's disease	9
Paratyphoid fever	11		

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January-August 1942	September 1942	October 1942—week ended—				
				3	10	17	24	31
ASIA								
Ceylon	C	102						
China:								
Kunming (Yunnanfu)	C	[1] 804						
Shanghai	C	1						
India	C	72,391	8,663					
Calcutta	C	1,967	88	22				
Chittagong	C	55						
Rangoon	C	1						
India (French)	C	10						

[1] For the period May 12 to July 4, 1942.

World distribution of cholera, plague, smallpox, typhus fever, and yellow f
Continued

PLAGUE

[C indicates cases; P, present]

Place		January-August 1942	September 1942	October 1942—week ended— 3	10	17	24	31
AFRICA								
Basutoland	C	10						
Belgian Congo	C	4						
British East Africa:								
Kenya	C	656	26	2	4	9		
Nairobi	C	64						
Uganda	C	318	3	3	4	2		
Egypt: Port Said	C	3						
Madagascar	C	91	1					
Morocco	C	312	13	2	3	13	6	
Senegal	C	[1] 5	1					
Union of South Africa	C	68						
ASIA								
China.[2]								
India	C	710	127					
Indochina (French)	C	72	1					
Palestine: Haifa	C	5						
EUROPE								
Portugal: Azores Islands	C	1						
NORTH AMERICA								
Canada: Alberta Province—Plague-infected fleas		P						
SOUTH AMERICA								
Argentina: Cordoba Province	C	7						
Brazil:								
Alagoas State	C	3						
Pernambuco State	C	6						
Chile: Valparaiso	C	1						
Peru:								
Ancash Department	C	6						
Lambayeque Department	C	3						
Libertad Department	C	7						
Salaverry—Plague-infected rats		P						
Lima Department	C	53						
Lima	C	18						
Piura Department	C	15						
OCEANIA								
Hawaii Territory: Plague-infected rats		42	1		4	2	2	1
New Caledonia	C		[3] 1					

[1] Includes 4 suspected cases.
[2] Plague has been reported in China as follows: Chekiang Province, Apr. 1–10, 1942, 4 cases; Fukien Province, Jan. 1–Apr. 5, 1942, plague appeared in 11 localities; Hunan Province, week ended Apr. 18, 1942, 2 cases; Suiyuan Province, pneumonic plague appeared in epidemic form during the period Jan. 1–Apr. 4, in the northwestern area.
[3] Pneumonic.

World distribution of cholera, plague, smallpox, typhus fever, and yellow fever—Continued

SMALLPOX

[C indicates cases]

Place		January-August 1942	September 1942	October 1942—week ended— 3	10	17	24	31
AFRICA								
Algeria	C	629	58		20			
Belgian Congo	C	321						
British East Africa: Tanganyika	C	21	12	4	2	10		
Dahomey	C	56						
French Guinea	C	76	58					
Gold Coast	C	1,095	108					
Ivory Coast	C	50						
Morocco	C	1,341	47	14	56	47	31	
Nigeria	C	1,566	195					
Niger Territory	C	772	212					
Portuguese East Africa	C	39	7					
Senegal	C	17						
Sudan (French)	C	213	61		22			
Tunisia	C	1						
Union of South Africa	C	828						
Zanzibar	C	[1] 2						
ASIA								
Ceylon	C	7						
China	C	9						
India	C	22,002	378					
Indochina (French)	C	2,908	254				[2] 121	
Iran	C	50						
Iraq	C	225	1					
Syria and Lebanon	C		175					
Trans-Jordan	C	2						
EUROPE								
France:								
Seine Department	C	44						
Unoccupied zone	C	13						
Great Britain:								
England and Wales	C	5						
Scotland	C	53						
Portugal	C	41	7		1	1		
Spain	C	200	4		1			
Turkey	C	[3] 105	223	37	27	123	49	
NORTH AMERICA								
Canada	C	4						1
Guatemala	C		6					
Mexico	C	93	3					
Panama Canal Zone	C	[4] 1						
SOUTH AMERICA								
Brazil	C	1						
Colombia	C	444						
Peru	C	[5] 1,147						
Venezuela (alastrim)	C	187						

[1] Imported.
[2] For the period Oct. 1-20, 1942.
[3] For the month of August 1942
[4] In the Canal Zone only.
[5] For the period Jan. 1-June 30, 1942

World distribution of cholera, plague, smallpox, typhus fever, and yellow fe—Continued

TYPHUS FEVER

[C indicates cases]

Place		January–August 1942	September 1942	October 1942—week ended— 3	10	17	24	31
AFRICA								
Algeria	C	34,550	363		72			
Basutoland	C	32						
British East Africa: Kenya	C	14	4					
Egypt	C	22,497	156					
Ivory Coast	C	4						
Morocco	C	25,546	120	25	30	39	44	
Nigeria	C	5						
Niger Territory	C	1						
Senegal	C	[1] 3						
Sierra Leone	C	7						
Tunisia	C	15,856	298		105			
Union of South Africa	C	613						
ASIA								
China	C	217						
India	C	7				2		
Iran	C	765						
Iraq	C	90	4					
Palestine	C	50	32	1	6			
Syria	C	22						
Trans-Jordan	C	5						
EUROPE								
Bulgaria	C	643	4					
Czechoslovakia	C	5						
France:								
Seine Department	C	1						
Unoccupied zone	C	228						
Germany	C	[2] 1,817						
Hungary	C	725	16	5	8	1	2	
Irish Free State	C	15						
Portugal	C	1						
Rumania	C	3,397	39	18		35	8	15
Spain	C	3,870						
Canary Islands	C	1						
Switzerland	C	1	2					
Turkey	C	305	28	4	3	4	6	
Union of Soviet Socialist Republics	C	67						
NORTH AMERICA								
Guatemala	C	121	11					
Jamaica	C	43	4					
Mexico	C	521	9					
Panama Canal Zone	C	1						
Puerto Rico	C	3						
SOUTH AMERICA								
Chile	C	49	8	2	2			
Colombia	C	1						
Ecuador	C	69	26		11		6	
Peru	C	923						
Venezuela	C	17						
OCEANIA								
Australia	C	27						
Hawaii Territory	C	34	4			2	2	

[1] Suspected.

[2] The report of 2,043 cases of typhus fever in Germany as published in the PUBLIC HEALTH REPORTS of Oct. 30, 1942, is an error. The number of cases reported should have been 1,817.

World distribution of cholera, plague, smallpox, typhus fever, and yellow fever—Continued

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January-August 1942	September 1942	October 1942—week ended—				
				3	10	17	24	31
AFRICA								
Belgian Congo: Libenge	D	[1]1						
British East Africa: Kenya	C	1						
French West Africa	C	1						
Gold Coast	C	[2]2	[1]1					
Ivory Coast	C	[2]2	4			[3]1		
Nigeria	C	1			[1]1			
Senegal [4]	D	1						
Sierra Leone: Freetown	C	2						
Sudan (French)	D	1	1					
Togo: Hohoe	C	1						
SOUTH AMERICA [5]								
Brazil:								
Acre Territory	D	4						
Bahia State	D	1						
Para State	D	1						
Colombia:								
Boyaca Department	D	5						
Cundinamarca Department	D	4						
Intendencia of Meta	D	3						
Santander Department	D	4						
Venezuela: Bolivar State	C		1					

[1] Suspected.
[2] Includes 1 suspected case.
[3] Death.
[4] According to information dated Feb. 9, 1942, 15 deaths from yellow fever among Europeans have occurred in Senegal.
[5] All yellow fever in South America is of the jungle type unless otherwise specified.

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Public Health Reports

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Public Health Reports

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THE INCIDENCE OF CANCER IN PHILADELPHIA, PA., 1938[1]

By HERBERT J. SOMMERS, *United States Public Health Service*

This is the ninth in a series of studies of cancer incidence and prevalence in selected areas of the United States. The data collected in the first eight have already been analyzed and the findings have been published or are in the process of being published in the PUBLIC HEALTH REPORTS (*1-8*). The present paper reports on the survey conducted in Philadelphia, Pa. As in the other areas, reports on all patients treated or observed for cancer during a specified calendar year, in this case 1938, were requested of all hospitals and physicians. The information obtained permitted the identification of cases reported by more than one source, and the separation of resident and nonresident cases. For a complete discussion of the general purpose of these studies, the nature of the data sought, and the technique employed in collecting the data, reference should be made to the first of the papers (*1*).

The population of Philadelphia in 1938 was 1,937,864, of whom 1,719,740 were white and 218,124 colored.[2] Reports on cancer cases were received from all hospitals, 154 in Philadelphia, and from all but 66 of the 3,090 doctors in active practice. Since 196 doctors submitted joint reports with other doctors or with hospitals, the number of individual doctor's reports received was 2,828. Among those submitting reports, 1,114 doctors and 75 hospitals had seen or treated cancer patients in 1938. The total number of cancer cases reported was 12,484. Of these, 11,815 were white and 669 were colored; 8,488 were residents and 3,996 nonresidents.

The reported cases are presented in table 1 according to the nature and number of reporting sources. Comparison of the percentage of cases in Philadelphia which received medical care from hospitals, 77 percent, with corresponding percentages in the other study areas (*1-8*), reveals that Philadelphia ranks very high in this respect, being

[1] From the Division of Public Health Methods, National Institute of Health. The data for this study were collected under the supervision of Arthur J. McDowell. Miss Bess A. Cheney was in immediate charge of the tabulation of the data, which was done as a project, Number 65-2-23-356, of the Work Projects Administration. The entire survey was directed by Harold F. Dorn.

[2] The populations used in this paper were obtained by interpolation between the 1930 census figures and the preliminary count of the 1940 census.

exceeded only by New Orleans, with a percentage of 78. Other study areas where large proportions of the cases received hospital treatment were Detroit, 72 percent, and Chicago, 70 percent. In Philadelphia, as in the areas previously studied, a somewhat larger proportion of the male than of the female and a much larger proportion of the colored than of the white cases received hospital care.

TABLE 1.—*Percentage of cancer cases reported by nature and number of reporting sources, sex, and color, Philadelphia, Pa., 1938*

Nature and number of reporting sources	Total			White			Colored		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Doctor(s) only	22.6	20.8	73.9	23.5	21.3	25.0	7.3	6.0	7.9
Hospital(s) only	63.7	65.5	62.4	62.5	64.7	61.1	83.3	87.0	81.7
Doctor(s) and hospital(s)	13.7	13.7	13.7	14.0	14.0	13.9	9.4	7.0	10.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
One source only	81.7	81.6	81.8	81.6	81.4	81.7	83.7	87.0	82.3
Two sources	14.8	14.9	14.8	14.8	15.1	14.7	14.2	10.0	16.0
Three or more sources	3.5	3.5	3.4	3.6	3.5	3.6	2.1	3.0	1.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of cases	12,484	5,259	7,225	11,815	5,059	6,756	669	200	469

A much larger proportion of the cases reported by hospitals than of those reported only by physicians had microscopically confirmed diagnoses (table 2). This was true for cases of every primary site. As would be expected, those sites most easily accessible for biopsy purposes had the highest proportions of microscopically confirmed diagnoses.[3]

Death certificates listing cancer as a cause of death were filed for 2,797 residents of Philadelphia in 1938. Of these, 701 were for persons not reported in the survey by doctors or hospitals. These 701, added to the reported resident cases, make the total number of 9,189 resident cases of cancer.

As reported in this survey, there were 474 cases of cancer for every 100,000 residents of Philadelphia in 1938 (table 3). Only two other surveyed areas, San Francisco-Alameda, with a rate of 526 per 100,000, and Denver, with a rate of 518 per 100,000, exceeded Philadelphia in the magnitude of cancer prevalence. However, it should be noted that the cancer prevalence rate of an area is affected strongly by the age composition of the population,[4] the primary site distribution of the cases, the availability of adequate medical facilities, the proportion of the cancer cases in the population which are brought to medical attention, and the completeness of follow-up after treatment has been

[3] With the usual exception of skin cancers. See earlier papers for discussion.

[4] At the time this article was prepared the 1940 census had not released population counts by age, so the precise influence of this factor in Philadelphia could not be determined.

concluded. Reference should be made to earlier papers (*1–8*) for full discussion of these factors.

There were large differences between the male and female and the white and colored cases in the frequency with which cancers of the

TABLE 2.—*Percentage of cases of cancer with a microscopically confirmed diagnosis, by primary site and whether or not reported by a hospital, Philadelphia, Pa., 1938*

Primary site	Percentage of cases with microscopically confirmed diagnosis for— All cases	Cases reported by hospitals	Cases reported only by physicians
Buccal cavity, pharynx	71 4	76.0	57.4
Lip	65 9	71 7	42.0
Tongue	74 7	79 5	57.1
Others	74 3	76 0	68.4
Digestive tract	58 0	63.4	39 7
Esophagus	73 3	76 7	57 7
Stomach, duodenum	38 9	45 5	21.7
Intestines	62 3	66 8	47 2
Rectum, anus	74 7	77 8	61.8
Liver, biliary passages	56 8	66 3	29 4
Others	47 6	52 5	22 6
Respiratory system	73 4	73 9	71.3
Larynx	86 5	85 6	89.6
Lungs, pleura	59.6	62 5	42 6
Others	95 8	94 7	100 0
Genitourinary system	73 6	75 7	64 3
Uterus	82 3	84 2	74 0
Prostate	44 0	47 0	27 3
Others	68 0	71 4	58 8
Breast	75	77 6	68 9
Skin	57 8	67 8	35 8
Brain	86 5	89 2	64 7
Bones (except jaw)	60 8	62 0	55 2
All others	66 7	69 4	55.4
All cases	67 9	72 0	53.9

TABLE 3.—*The number of reported cases of and recorded deaths from cancer, residents only, by sex and color, and the cancer prevalence and death rates, Philadelphia Pa., 1938*

	Total			White			Colored		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Number of resident cases	8,488	3,526	4,962	7,886	3,347	4,539	602	179	423
Deaths of residents not reported as a case	701	288	413	660	273	387	41	15	26
Total resident cases [1]	9,189	3,814	5,375	8,546	3,620	4,926	643	194	449
Total resident deaths	2,797	1,333	1,464	2,565	1,242	1,323	232	91	141
Ratio of resident cases to deaths	3 3	2 9	3 7	3 3	2 9	3 7	2.8	2 1	3.2
Prevalence rate per 100,000 population	474 2	396 9	550 1	496 9	424 8	568 4	294 8	180.0	406.3
Cancer death rate per 100,000 population	144 3	138 7	149.8	149 2	145.6	152 7	106 4	84.5	127 8

[1] Reported resident cases plus recorded deaths of residents not reported as a case.

various primary sites occurred (table 4). Of the total male cases, 27.3 percent were primary in the digestive tract, 19.2 percent in the skin, 17.5 percent in the genitourinary system, and 15.1 percent in the buccal cavity. Among females, the sites most frequently attacked by cancer were the genitourinary system, 33.8 percent, and the breast, 29.3 percent. The chief difference between the primary site compositions of the white and colored cases lay in the relative frequency with which skin cancer occurred among them. Only 2.2 percent of the colored cases were primary in the skin, as compared with 14.6 percent of the white cases. Genitourinary cancers formed a larger part of the colored cases (44.2 percent) than of the white (26.0 percent).

TABLE 4.—*Percentage distribution of reported cancer cases, by primary site, sex, and color, Philadelphia, Pa., 1938*

Primary site	White			Colored		
	Both sexes	Male	Female	Both sexes	Male	Female
Buccal cavity, pharynx	7.9	15.3	2.4	5.5	8.5	4.3
Lip	3.0	6.1	.6	.3	1.0	-----
Tongue	1.3	2.5	.4	1.5	3.5	.6
Others	3.7	6.7	1.4	3.7	4.0	3.7
Digestive tract	20.7	26.9	16.0	21.5	37.5	14.7
Esophagus	1.2	2.0	.6	1.3	3.5	.4
Stomach, duodenum	5.8	8.5	3.8	9.1	18.5	4.9
Intestines	5.8	6.2	5.5	3.4	4.5	3.0
Rectum, anus	5.4	7.2	4.0	3.9	5.5	3.2
Liver, biliary passage	1.1	1.0	1.1	1.0	2.5	.4
Others	1.5	2.0	1.0	2.8	3.0	2.8
Respiratory system	5.9	11.7	1.7	3.6	9.0	1.3
Larynx	2.8	6.0	.5	.7	2.5	------
Lungs, pleura	2.9	5.4	1.1	2.9	6.5	1.3
Others	.2	.3	.1	-	-	---
Genitourinary system	26.0	16.9	32.7	44.2	31.5	49.6
Uterus	14.0	-	24.4	29.5		42.1
Prostate	2.8	6.4		4.6	15.5	--
Others	9.2	10.5	8.3	10.1	16.0	7.5
Breast	17.2	.3	29.9	15.6	1.0	21.7
Skin	14.6	19.8	10.7	2.2	3.0	1.9
Brain	1.3	1.8	.8	.9	2.0	.4
Bones (except jaw)	1.3	1.9	.9	1.0	2.0	.6
All others	5.1	5.4	4.9	5.5	5.5	5.5
All cases	100.0	100.0	100.0	100.0	100.0	100.0

The age distribution of the reported cases (tables 5 and 6) shows that, although cancer is most commonly a disease of late adult life, it also occurs at younger ages.

Approximately 29 percent of the male and 43 percent of the female cases occurred in the middle period of life, the ages from 25 to 55. That a greater proportion of female than of male cases developed during this age period is due to the fact that breast and uterus cases, which in Philadelphia accounted for 55 percent of the total reported female cases, most frequently develop at these ages.

Although 88 percent of the total male cases were reported for persons aged 45 and over, there were two sites where large proportions of the cases developed at early ages. In these sites, the brain and skeletal system, 66 and 39 percent respectively, were reported for persons younger than 45 years of age.

TABLE 5.—*Percentage distribution of reported male cancer cases of known age, by primary site and age, Philadelphia, Pa., 1938*

Primary site	Age								Number of cases of known age
	Under 25	25-34	35-44	45-54	55-64	65-74	75 and over	Total	
Buccal cavity, pharynx	0.9	1.8	5.3	16.3	25.1	33.5	17.1	100.0	778
Lip	.3	1.0	6.5	20.6	22.9	29.4	19.3	100.0	306
Tongue	----	1.5	4.6	13.8	30.8	28.5	20.8	100.0	130
Others	1.8	2.6	4.4	13.4	24.9	39.2	13.7	100.0	342
Digestive tract	1.0	1.6	6.3	21.5	30.0	29.0	10.6	100.0	1,402
Esophagus	---	1.9	.9	21.0	32.4	31.4	12.4	100.0	105
Stomach, duodenum	.4	.7	5.9	21.2	32.6	28.7	10.5	100.0	457
Intestines	1.0	1.9	6.1	23.7	27.6	30.4	9.3	100.0	312
Rectum, anus	1.4	2.4	8.4	20.4	30.4	26.4	10.6	100.0	368
Liver, biliary passages	1.8	1.8	5.4	19.6	16.1	32.1	23.2	100.0	56
Other	2.9	1.9	7.7	21.2	28.8	30.8	6.7	100.0	104
Respiratory system	.7	2.2	9.8	28.4	35.0	19.2	4.7	100.0	599
Larynx	----	1.6	7.2	25.2	37.1	23.0	5.9	100.0	305
Lungs, pleura	1.1	2.5	12.5	30.8	34.1	15.8	3.2	100.0	279
Others	6.7	6.7	13.3	46.6	13.3	6.7	6.7	100.0	15
Genitourinary system	1.6	3.3	6.3	14.0	24.9	33.5	16.4	100.0	886
Prostate	----	.3	.6	4.9	25.9	44.8	23.5	100.0	344
Others	2.6	5.2	10.0	19.7	24.4	26.3	11.8	100.0	542
Breast	----	----	----	11.8	29.4	52.9	5.9	100.0	17
Skin	.8	2.1	5.8	15.2	24.5	30.7	20.9	100.0	948
Brain	34.0	11.7	20.2	20.2	12.8	1.1	----	100.0	94
Bones (except jaw)	20.4	7.5	10.8	24.7	22.6	10.8	3.2	100.0	93
All others	11.8	7.2	12.9	22.2	18.3	20.1	7.5	100.0	279
All cases	2.6	2.7	7.2	19.1	26.8	28.3	13.3	100.0	5,096

Two sites, the digestive tract and the respiratory system, showed great concentration of male cases in the 45 to 64-year age group; 52 percent of the digestive tract cases and 63 percent of the respiratory system cases occurred at these ages. More than 50 percent of the male cases of the buccal cavity, genitourinary system, and skin, and 68 percent of the prostate cases occurred among males aged 65 and over.

Cancer generally develops at earlier ages among females than among males. In the present study, this held true for every one of the broad site classifications (table 6). Among females, 74 percent of the brain and 55 percent of the bone cases occurred at ages under 45. Approximately 50 percent of the cases of the digestive tract, genitourinary system, breast, and respiratory system were found in females aged 45 to 64. There was only one site among females where more than half the cases occurred at ages 65 and over; 51 percent of the skin cancers were found at these ages.

Tables 5 and 6 indicate the ages at which the different organs or parts of the body developed cancer. Of course, since cancers of some sites occur more frequently than others, these tables do not show the relative importance of the various sites at each age. The relative frequency by age for certain broad groups of sites is presented in figure 1.

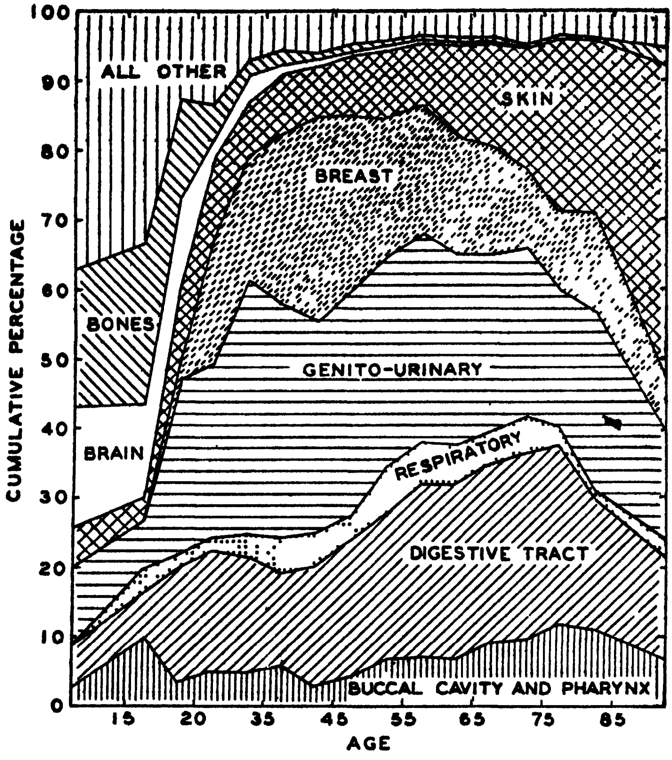

FIGURE 1.—Percentage distribution of resident cases of cancer by age and primary site, Philadelphia, Pa., 1938

The brain, bones, and "all other" group,[5] the most common sites of cancer among children and adolescents, were relatively less prominent among the cases in the older age groups. Among adults under 75 years of age, the digestive tract, genitourinary system, and breast were the most frequent sites of cancer. Skin cancer was the most frequent site encountered in persons aged 75 and over.

Prevalence rates by primary site, sex, and color are presented in table 7. These rates are based on all resident cases seen or treated for cancer in Philadelphia in 1938. For cancer of each site, white male rates were higher than the corresponding rates for colored males, and, with certain exceptions, the rates for white females exceeded

[5] The "all other" group consists of cases located in glands or designated by vague or ill-defined sites.

TABLE 6.—*Percentage distribution of reported female cancer cases of known age, by primary site and age, Philadelphia, Pa., 1938*

Primary site	Age								Number of cases of known age
	Under 25	25–34	35–44	45–54	55–64	65–74	75 and over	Total	
Buccal cavity, pharynx	5.2	5.2	10.9	20.0	23.6	23.6	11.5	100.0	174
Lip		2.6	15.4	20.5	17.9	23.1	20.5	100.0	39
Tongue				23.3	30.1	33.3	13.3	100.0	30
Others	8.6	7.6	12.4	19.0	23.8	21.0	7.6	100.0	105
Digestive tract	.6	3.4	8.7	20.1	31.0	25.7	10.5	100.0	1,116
Esophagus		5.1	2.6	15.4	33.3	38.5	5.1	100.0	39
Stomach, duodenum	.4	1.9	6.7	14.2	35.2	29.2	12.4	100.0	267
Intestines	.5	3.5	9.6	24.2	27.1	25.0	10.1	100.0	376
Rectum, anus		5.0	11.5	22.7	29.8	21.6	9.4	100.0	278
Liver, biliary passages		4.0	5.3	20.0	30.7	32.0	8.0	100.0	75
Others	4.9	1.2	7.4	13.6	38.3	19.8	14.8	100.0	81
Respiratory system	2.6	6.8	14.5	18.8	28.2	26.5	2.6	100.0	117
Larynx	3.0	12.1	15.2	12.1	39.4	18.2		100.0	33
Lungs, pleura	1.3	5.3	14.5	21.1	22.4	31.5	3.9	100.0	76
Others	12.5		12.5	25.0	37.5	12.5		100.0	8
Genitourinary system	.8	4.8	15.9	28.6	28.4	16.7	4.8	100.0	2,396
Uterus	.4	4.8	17.4	30.0	28.4	15.6	3.4	100.0	1,810
Others	2.0	4.6	11.4	24.3	28.4	20.3	9.0	100.0	586
Breast	.1	3.4	16.6	27.9	26.8	18.0	7.2	100.0	2,050
Skin	1.0	2.0	6.3	16.0	23.2	29.3	22.2	100.0	686
Brain	26.3	26.3	21.1	15.8	8.8	1.7		100.0	57
Bones (except jaw)	30.8	12.3	12.3	9.2	7.7	18.5	9.2	100.0	65
All others	7.7	6.5	13.0	17.4	28.2	19.5	7.7	100.0	339
All cases	1.6	4.3	13.8	24.5	27.3	20.1	8.4	100.0	7,000

those of colored females. These exceptions were the buccal cavity and the genitourinary system. While the relative excess of colored female cases of the genitourinary system is consistent with the well-known high incidence of cancer of the uterus among colored females, it is unusual to find a higher buccal cavity rate for the colored females. However, it should be noted that among the colored female buccal cavity cases there were 16 cases of the tongue and other buccal cavity sites, and no cases of lip cancer.

The sites with the highest prevalence rates among males were the digestive tract, with a rate of 126.3 per 100,000 persons, the genitourinary system, 79.7 per 100,000, and the skin, 67.2 per 100,000. For females, the most common sites were the genitourinary system, 175.2 per 100,000, the breast, 157.4 per 100,000, and the digestive tract, 108.9 per 100,000. In table 7, it is evident that the male rate for every site except the genitourinary system and the breast was higher than the corresponding female rate, but that, due to the extremely high female rate for these two sites, the female rate for all cases was considerably higher than the male.

TABLE 7.—*Number of resident cancer cases per 100,000 persons, by primary site, sex, and color, Philadelphia, Pa., 1938*

Primary site	White			Colored		
	Both sexes	Male	Female	Both sexes	Male	Female
Buccal cavity, pharynx	35.4	59.8	11.2	12.8	11.1	14.5
Lip	12.7	22.6	3.0	.4	.9	----------
Tongue	6.2	10.4	2.0	4.1	5.6	2.7
Others	16.5	26.8	6.2	8.3	4.6	11.8
Digestive tract	123.7	133.1	114.6	68.8	73.3	64.3
Esophagus	5.2	8.0	2.5	4.1	6.5	1.8
Stomach, duodenum	38.6	45.4	32.2	29.8	37.2	21.7
Intestines	33.7	30.6	36.8	11.5	9.3	13.6
Rectum, anus	27.7	31.2	24.2	12.4	11.1	13.6
Liver, biliary passages	9.1	6.8	11.3	3.2	4.6	1.8
Others	9.4	11.1	7.6	8.3	4.6	11.8
Respiratory system	22.9	37.8	8.2	11.0	16.7	5.4
Larynx	8.5	15.9	1.3	1.8	3.7	----------
Lungs, pleura	13.4	20.6	6.2	8.7	12.1	5.4
Others	1.0	1.3	.7	.5	.9	----------
Genitourinary system	127.9	82.8	172.4	127.4	55.7	197.5
Uterus	61.9	----------	122.9	83.4	----------	164.9
Prostate	16.7	33.8	----------	13.3	26.9	----------
Others	49.3	49.0	49.5	30.7	28.8	32.6
Breast	84.4	1.5	165.9	46.8	1.9	90.6
Skin	67.5	75.1	60.0	6.0	4.6	7.2
Brain	3.3	3.8	2.9	2.7	3.7	1.8
Bones (except jaw)	6.1	6.8	5.4	2.3	1.9	2.7
All others	25.7	23.6	27.8	17.0	11.1	22.8
All cases	496.9	424.3	568.4	294.8	180.0	406.8

Malignancies of different organs of the body do not respond equally well to treatment. As a result, the proportion of reported cases which have been cured and are under observation only varies from site to site. Of the reported cases of buccal cavity and skin cancer in Philadelphia, 25.6 and 25.3 percent, respectively, were under observation only and had received no treatment during 1938. Only 7.8 and 9.5 percent of the digestive tract and brain cases were in that

TABLE 8.—*Percentage of total reported resident cases of cancer that were under observation only during 1938, and percentage that were first diagnosed during 1938, by primary site, Philadelphia, Pa., 1938*

Primary site	Percentage: Under observation only during study year	Percentage: First diagnosis during study year	Primary site	Percentage: Under observation only during study year	Percentage: First diagnosis during study year
Buccal cavity, pharynx	25.6	43.2	Brain	9.5	66.7
Digestive tract	7.8	69.8	Bones (except jaw)	16.0	47.0
Respiratory system	10.3	66.1	All others	17.6	58.2
Genitourinary system	20.5	49.4	All cases	17.9	53.4
Breast	20.6	44.1			
Skin	25.3	45.0			

class (table 8), indicating that relatively few cancers of these sites had been arrested.

It should be borne in mind that the possibility of recurrence is not considered to be the same for the various types of cancer, so that an arrested case of cancer of the uterus is usually kept under observation for a much longer period of time than an arrested case of cancer of the skin. For this reason, the proportion of skin cancers reported as under observation only probably does not reflect accurately the true number of cured cases in the population.

Incidence rates for Philadelphia, based upon cases first diagnosed in 1938, are presented in table 9. These rates exclude all cases seen prior to the study year, even though such cases may still have been receiving treatment or medical observation during that year. Thus the incidence rates are not affected by the varying fatality of the different sites, or by the varying thoroughness with which cured cases of different sites are followed up. That these differences in fatality and in period of observation are considerable is demonstrated by the fact that while only 44 percent of the breast cases in Philadelphia in 1938 were new cases, first diagnosed during 1938, 70 percent of the digestive tract cases were of that class (table 8).

The incidence rates and the corresponding prevalence rates for each of the broad primary sites are compared in figure 2. As indicated in table 8, the difference between the two rates is relatively greater for those sites which yield most readily to treatment.

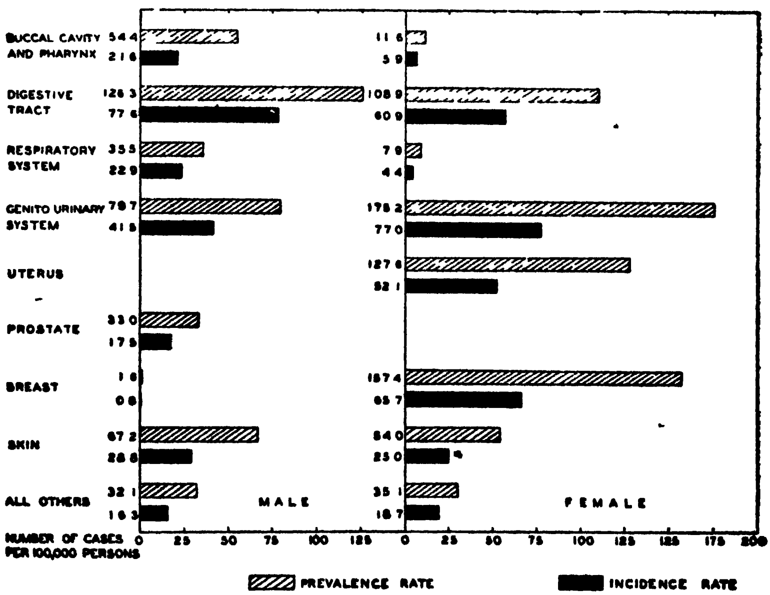

FIGURE 2.—Cancer prevalence and incidence rates per 100,000 persons, Philadelphia, Pa., 1938.

TABLE 9.—*Number of resident cancer cases first diagnosed in 1938 per 100,000 persons, by primary site, sex, and color, Philadelphia, Pa., 1938*

	White			Colored		
	Both sexes	Male	Female	Both sexes	Male	Female
Buccal cavity, pharynx	14.6	23.8	5.7	5.5	3.7	7.2
Lip	4.9	8.2	1.7			
Tongue	3.0	5.0	1.0	2.3	2.8	1.8
Others	6.7	10.6	3.0	3.2	.9	5.4
Digestive tract	72.1	80.6	63.8	45.9	53.8	38.1
Esophagus	3.5	5.2	1.8	4.1	6.5	1.8
Stomach, duodenum	21.9	27.9	16.0	19.3	27.0	11.9
Intestines	21.0	18.5	23.5	6.9	6.5	7.2
Rectum, anus	15.2	18.5	11.9	6.4	4.6	8.2
Liver, biliary passages	4.4	3.3	5.5	3.2	4.6	1.8
Others	6.1	7.2	5.1	6.0	4.6	7.2
Respiratory system	14.5	24.4	4.6	6.9	11.2	2.7
Larynx	4.1	7.7	.5	.9	1.9	
Lungs, pleura	9.9	16.0	3.9	6.0	9.3	2.7
Others	.5	.7	.2			
Genitourinary system	59.0	42.1	75.6	62.8	37.1	87.9
Uterus	24.8		49.2	38.1		75.2
Prostate	8.5	17.2		9.6	19.5	
Others	25.7	24.9	26.4	15.1	17.6	12.7
Breast	35.1	.9	68.7	21.5	[illegible]	42.6
Skin	30.1	32.2	28.0	1.4	1.9	.9
Brain	2.3	2.6	2.1	.9	1.9	
Bones (except jaw)	2.6	2.8	2.4	.9	.9	.9
All others	13.3	11.7	14.8	10.5	7.4	13.6
All cases	243.6	221.1	265.7	156.3	117.9	193.9

Although a quarter of the reported resident cases in Philadelphia were cancers of the digestive tract, cancer of this site was responsible for 43 percent of the recorded cancer deaths (table 10). It is apparent that the patient suffering from cancer of the genitourinary system had a much better chance of survival, for these cases, although approximately equal in number to the digestive tract cases, resulted in only 24.0 percent of the recorded deaths. Very slight mortality was indicated for skin cancers, which made up 13 percent of the reported cases, but only 2 percent of the recorded deaths.

TABLE 10.—*Percentage distribution of resident recorded deaths and reported cases, by primary site, Philadelphia, Pa., 1938*

Primary site	Percentage distribution		Primary site	Percentage distribution	
	Recorded deaths	Reported cases		Recorded deaths	Reported cases
Buccal cavity, pharynx	4.9	6.5	Bones (except jaw)	1.2	1.2
Digestive tract	43.5	24.8	All others	7.7	5.8
Respiratory system	6.5	4.5	All cases	100.0	100.0
Genitourinary system	24.0	26.8	Number of cases	2,797	9,189
Breast	10.5	16.9			
Skin	1.6	12.8			
Brain	.1	.7			

A comparison of the durations of cases alive at the end of the study year and cases dead at the end of the study year is made in table 11.[6] More than half of the cases reported as having died sometime during the study year had lived for less than 6 months after first diagnosis. Only 27 percent of the living cases had had such short duration. Over half of the living cases had durations of more than a year, as against a corresponding figure of 27 percent for the dead cases.

TABLE 11.—*Number and percentage of cases which were diagnosed for less than a certain specified number of months, classified by reported vital status at end of study year, Philadelphia, Pa., 1938*

Duration since first diagnosis of less than	Number			Percent		
	All cases[1]	Alive	Dead	All cases	Alive	Dead
6 months	4,329	2,467	1,784	34.0	27.0	56.2
12 months	7,081	4,625	2,327	56.7	50.7	73.3
18 months	8,262	5,529	2,591	66.2	60 6	81.6
24 months	9,030	6,138	2,743	72.3	67.3	86.4
30 months	9,570	6,563	2,851	76 7	71.9	89.8
36 months	10,004	6,924	2,917	80 1	75.9	91.9
42 months	10 348	7,211	2,970	83.0	79.0	93 6
48 months	10,650	7,477	3,004	85.3	81.9	94.6
54 months	10,903	7,700	3,033	87 3	84.4	95.6
60 months	11,081	7,861	3,050	88 8	86.2	96.1
Total	12,484	9,124	3,174	100 0	100.0	100.0

[1] Contains 186 cases of unknown vital status.

To a considerable degree, the differences in duration of the two groups of cases are a reflection of their primary site compositions. The dead cases consisted to a much greater extent of cancers of sites more difficult to treat (table 10). However, the factor of primary site does not appear to be the sole determinant of the different durations of the living and dead cases. As indicated in table 12, the

TABLE 12.—*Percentage of cases which were diagnosed for less than a certain specified number of months, classified by primary site and vital status at end of study year, Philadelphia, Pa., 1938*

Duration since first diagnosis of less than	Buccal cavity		Digestive tract		Respiratory system		Genitourinary system		Breast	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
6 months	23.1	27.6	39.4	72.1	37.6	66.4	23.3	47.1	24.1	34.3
12 months	42.8	61 8	67 4	87 0	61 8	81 2	47 8	67.6	45.7	48.8
18 months	52.3	75.4	76.7	92.3	71.4	86 8	57 7	78.1	55.3	62.5
24 months	60 7	83.4	81.3	94.4	77 8	89 2	64 8	84.5	61.7	71.5
30 months	65.5	87.9	84.7	95.9	81 8	91.6	69.2	88.7	67.2	79.9
36 months	69.6	88 9	86 8	97.1	83.3	92 4	73 4	91.3	72.0	83.9
42 months	72.7	91.0	88.7	97.6	86.4	93.6	76.7	93.1	75.9	88.4
48 months	76.7	92 5	90.3	98.1	87.9	94.8	79.7	94.5	79.4	90.2
54 months	79.3	94.5	91 7	98.5	91.6	95.6	81.9	95 6	82.5	91.6
60 months	82.7	95.5	92 4	98 7	92.5	95.6	83.6	95.9	84 5	93.1
Number of cases	759	199	1,357	1,188	455	250	2,536	780	1,732	379

[6] For living cases, duration was computed from the data of first diagnosis to the end of the study year, and for dead cases, from the date of first diagnosis to the reported date of death.

dead cases of each site had shorter durations than the living. The longer duration of the living cases of a particular site must have arisen from more successful treatment, probably due to earlier diagnosis.

SUMMARY

The number of cancer cases under medical care in Philadelphia, Pa., in 1938, was 12,484. Of these, 11,815 were white and 669 were colored; 8,488 were residents and 3,996 were nonresidents. Death certificates listing cancer as a cause of death were filed for 2,797 residents, 701 of whom were not reported by doctors or hospitals in the survey. These 701, added to the reported cases, make a total number of 9,189 resident cases of cancer.

There were 474 cases of cancer per 100,000 residents. This is the third highest rate among the ten surveyed areas. The two highest rates were: San Francisco and Alameda Counties, Calif., 526 per 100,000; Denver, Colo., 518 per 100,000.

Large differences existed between the male and female and the white and colored cases in the frequency with which cancers of the various primary sites were reported. The primary sites of most frequent occurrence among males were the digestive tract and skin; among females, the genitourinary system and the breast. A relatively small proportion of the colored cases, as compared with the white, were primary in the skin.

For each site, the frequency of occurrence of cancer varied with age. Large proportions of the brain and bone cases occurred at ages under 45 years; digestive tract, respiratory system, uterus, and breast cases occurred most frequently at ages 45 to 64; and prostate and skin cases were most common at ages 65 and over.

The male prevalence rate for every site except the genitourinary system and the breast was higher than the corresponding female rate, but due to the extremely high female rate for these two sites, the female rate for all cases was considerably higher than the male. The rate for females was 550 per 100,000; for males, 397.

Malignancies of different organs of the body do not respond equally well to treatment. Among the reported cases of the various primary sites, there was considerable variation in the proportions which were under observation only, and had received no treatment during 1938.

Of the reported cases, 34 percent had durations of less than 6 months from date of first diagnosis to date of death or the end of the study year, and 57 percent had durations of under a year.

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Appendix

The appendix tables, which present the absolute numbers of cases, are serialized so as to correspond with the tables in the text which are based upon them.

TABLE 2.—*Number of cancer cases with and without a microscopically confirmed diagnosis, by primary site and whether or not reported by a hospital, Philadelphia, Pa., 1938*

Primary site	Number of cases			
	Reported by hospitals		Reported only by physicians	
	With microscopically confirmed diagnosis	Without microscopically confirmed diagnosis	With microscopically confirmed diagnosis	Without microscopically confirmed diagnosis
Buccal cavity, pharynx	579	193	116	86
Lip	203	80	29	40
Tongue	101	26	20	15
Others	275	87	67	31
Digestive tract	1,265	730	235	357
Esophagus	92	28	15	11
Stomach, duodenum	245	294	45	162
Intestines	365	181	77	86
Rectum, anus	414	118	81	50
Liver, biliary passages	65	33	10	24
Others	84	76	7	24
Respiratory system	435	154	97	39
Larynx	225	38	69	8
Lungs, pleura	192	115	23	31
Others	18	1	5	----------
Genitourinary system	2,074	665	400	222
Uterus	1,269	239	251	88
Prostate	142	160	15	40
Others	663	266	134	94
Breast	1,223	354	385	174
Skin	810	385	195	349
Brain	124	15	11	6
Bones (except jaw)	85	52	16	13
All others	360	159	67	54
All cases	6,955	2,707	1,522	1,300

[illegible] Philadelphia, Pa., [illegible]

Primary site	White			Colored		
	Both sexes	Male	Female	Both sexes	Male	Female
Buccal cavity, pharynx	937	776	161	37	17	20
Lip	350	310	40	2	2	----------
Tongue	152	125	27	10	7	3
Others	435	341	94	25	8	17
Digestive tract	2,443	1,362	1,081	144	75	69
Esophagus	137	99	38	9	7	2
Stomach, duodenum	686	432	254	60	37	23
Intestines	686	312	374	23	9	14
Rectum, anus	637	366	271	26	11	15
Liver, biliary passages	125	52	73	7	5	2
Others	172	101	71	19	6	13
Respiratory system	701	588	113	24	18	6
Larynx	335	302	33	5	5	----------
Lungs, pleura	342	271	71	19	13	6
Others	24	15	9	----------	----------	----------
Genitourinary system	3,066	855	2,211	295	63	232
Uterus	1,650	----------	1,650	197	----------	197
Prostate	326	326	----------	31	31	----------
Others	1,090	529	561	67	32	35
Breast	2,032	16	2,016	104	2	102
Skin	1,724	1,000	724	15	6	9
Brain	150	93	57	6	4	2
Bones (except jaw)	159	95	64	7	4	3
All others	603	274	329	37	11	26
All cases	11,815	5,059	6,756	669	200	469

Table 7.—*Number of resident cases of cancer,*[1] *by primary site, sex, and color, Philadelphia, Pa., 1938*

Primary site	White			Colored		
	Both sexes	Male	Female	Both sexes	Male	Female
Buccal cavity, pharynx	608	511	97	28	12	16
Lip	219	193	26	1	1	----------
Tongue	106	89	17	9	6	3
Others	283	229	54	18	5	13
Digestive tract	2,128	1,135	993	150	79	71
Esophagus	90	68	22	9	7	2
Stomach, duodenum	666	387	279	64	40	24
Intestines	579	261	318	25	10	15
Rectum, anus	476	266	210	27	12	15
Liver, biliary passages	156	58	98	7	5	2
Others	161	95	66	18	5	13
Respiratory system	394	323	71	24	18	6
Larynx	147	136	11	4	4	----------
Lungs, pleura	230	176	54	19	13	6
Others	17	11	6	1	1	----------
Genitourinary system	2,200	706	1,494	278	60	218
Uterus	1,065	----------	1,065	182	----------	182
Prostate	288	288	----------	29	29	----------
Others	847	418	429	67	31	36
Breast	1,451	13	1,438	102	2	100
Skin	1,161	641	520	13	5	8
Brain	57	32	25	6	4	2
Bones (except jaw)	105	58	47	5	2	3
All others	442	201	241	37	12	25
All cases	8,546	3,620	4,926	643	194	449

[1] Includes 701 cases not reported by doctors or hospitals, but recorded as resident deaths of cancer in 1938.

Table 8.—*Number of resident cancer cases reported, number under observation only, and number first diagnosed during 1938, Philadelphia, Pa.*

Primary site	Number of resident cases reported: Total	Under observation only during 1938	First diagnosed during 1938
Buccal cavity, pharynx	613	157	265
Digestive tract	1,919	150	1,340
Respiratory system	398	41	263
Genitourinary system	2,332	478	1,151
Breast	1,473	303	650
Skin	1,159	293	521
Brain	63	6	42
Bones (except jaw)	100	16	47
All others	431	76	251
All cases	8,488	1,520	4,530

Table 9.—*Number of resident cancer cases first diagnosed in 1938, by primary site, sex, and color, Philadelphia, Pa.*

Primary site	White			Colored		
	Both sexes	Male	Female	Both sexes	Male	Female
Buccal cavity, pharynx	253	203	50	12	4	8
Lip	85	70	15			
Tongue	52	43	9	5	3	2
Others	116	90	26	7	1	6
Digestive tract	1,240	687	553	100	58	42
Esophagus	60	44	16	9	7	2
Stomach, duodenum	377	238	139	42	29	13
Intestines	361	158	203	15	7	8
Rectum, anus	261	158	103	14	5	9
Liver, biliary passages	76	28	48	7	5	2
Others	105	61	44	13	5	8
Respiratory system	248	208	40	15	12	3
Larynx	70	66	4	2	2	
Lungs, pleura	170	136	34	13	10	3
Others	8	6	2			
Genitourinary system	1,014	359	655	137	40	97
Uterus	426		426	83		83
Prostate	147	147		21	21	
Others	441	212	229	33	19	14
Breast	603	8	595	47		47
Skin	518	275	243	3	2	1
Brain	40	22	18	2	2	
Bones (except jaw)	45	24	21	2	1	1
All others	228	100	128	23	8	15
All cases	4,189	1,886	2,303	341	127	214

CHANGES IN MORTALITY RATES, 1930 TO 1940 [1]

By HAROLD F. DORN, *United States Public Health Service*

The decade 1930 to 1940 is the first for which mortality records have been available for the entire country. It is true that the death registration area did not include each State until Texas was admitted in 1933 but insofar as the analysis of the trend in mortality rates is concerned the proportion of the total population included in the death registration area in 1930 was sufficiently large to justify considering the death rates of that area as representative of the entire country. In addition to the fact that data for every State are available, the past decade is notable for the prolonged economic depression which lasted throughout practically the entire period. An attempt can now be made to discover the effect, if any, of this depression upon the trend in mortality rates.

CHANGES IN EXPECTATION OF LIFE

Total population.—Between 1930 and 1940 the expectation of life at birth of the total population increased from 59.0 to 63.3 years, an increase of 4.3 years or 7 percent (table 1). Increases occurred throughout the entire life span, the average increase being about 5 percent. At the beginning of the century, 40 years previously, the expectation of life at birth for the population of the original registration States was 49.2 years; the corresponding figure in 1939, 63.3 years, represents an increase of 14.1 years, or 29 percent.

TABLE 1.—*Expectation of life at selected ages, total population of the United States, 1900–02, 1929–31, and 1939, and percentage change 1900–02 to 1939 and 1929–31 to 1939*

Age	Original registration States, 1900–02 [1]	Registration States, 1929–31	United States, 1939	Percentage increase	
				1900–02 to 1939	1929–31 to 1939
0	49.2	59.0	63.3	29	7
5	55.0	59.2	62.4	13	5
10	51.1	54.8	57.7	13	5
15	46.8	50.2	53.0	13	6
20	42.8	45.9	48.5	13	6
30	35.5	37.7	39.6	12	5
40	28.3	29 6	31.0	10	5
50	21.3	22.0	23.0	8	5
60	14 8	15.1	15.9	7	5
70	9 3	9.5	10.0	8	5
80	5.3	5.5	5.6	6	2

[1] From United States Life Tables, 1890, 1901, 1910, and 1901–10.

Changes in white and nonwhite populations.—During the past decade the percentage increase in expectation of life was more than twice as large in the Negro as in the white population (tables 2, 3, 4). The

[1] From the Division of Public Health Methods, National Institute of Health.

TABLE 2.—*Expectation of life at selected ages, white male population of the United States, 1900–02, 1929–31, and 1939–40, and the percentage change 1900–02 to 1939–40 and 1929–31 to 1939–40*

Age	Original registration States, 1900–02 [1]	Registration States, 1929–31 [2]	United States, 1939–40	Percentage increase	
				1900–02 to 1939–40	1929–31 to 1939–40
0	48.2	59.1	62.6	30	6
5	54.4	59.4	61.6	13	4
10	50.6	55.0	56.9	12	3
15	46.3	50.4	52.3	13	4
20	42.2	46.0	47.7	13	4
30	34.9	37.5	38.7	11	3
40	27.7	29.2	30.0	8	3
50	20.8	21.5	21.9	5	2
60	14.4	14.7	15.0	4	2
70	9.0	9.2	9.4	4	2
80	5.1	5.3	5.1	0	−4

[1] From United States Life Tables, 1890, 1901, 1910, and 1901–10.
[2] From United States Life Tables, 1930.

average increase was between 3 and 4 percent for white males and 5 percent for white females compared with increases of about 9 and 11 percent for Negro males and females. Not only was the relative increase in expectation of life greater for Negroes than for whites but the absolute numerical increase was also greater. The expectation of life at birth increased 3.5 years for white males but 4.4 years for Negro males; the increase for females was 4.3 and 5.7 years, respectively. One reason for the smaller increase in life expectancy in the white population is the fact that this population is much closer to the maximum expectation of life attainable with present knowledge than is the Negro population. The large percentage increases in expectation of life of Negroes at ages 70 and 80 are probably due in part to an overstatement of age by Negroes when enumerated for the Census of 1940.

TABLE 3.—*Expectation of life at selected ages, white female population of the United States, 1900–02, 1929–31, 1939–40, and the percentage change 1900–1902 to 1939–40 and 1929–31 to 1939–40*

Age	Original registration States, 1900–02 [1]	Registration States, 1929–31 [2]	United States, 1939–40	Percentage change	
				1900–02 to 1939–40	1929–31 to 1939–40
0	51.1	62.7	67.0	31	7
5	56.0	62.2	65.3	17	5
10	52.2	57.7	60.6	16	5
15	47.8	53.0	55.9	17	5
20	43.8	48.5	51.2	17	6
30	36.4	40.0	42.1	16	5
40	29.2	31.5	33.1	13	5
50	21.9	23.0	24.6	12	5
60	15.2	16.1	16.9	11	5
70	9.6	10.0	10.4	8	4
80	5.5	5.6	5.8	5	4

[1] From United States Life Tables, 1890, 1901, 1910, and 1901–10.
[2] From United States Life Tables, 1930.

TABLE 4.—*Expectation of life at selected ages, Negro population of the United States, 1929–31 and 1939–40, by sex, and the percentage change 1929–31 to 1939–40*

Age	Males		Females		Percentage change 1929–31 to 1939–40	
	Registration States, 1929–31 [1]	United States, 1939–40	Registration States, 1929–31 [1]	United States, 1939–40	Male	Female
0	47.6	52.0	49 5	55.2	9	12
5	48 7	52.8	49 8	55.1	8	11
10	44 3	48.1	45.3	50 4	9	11
15	39 8	43.6	40.9	45.8	10	12
20	36 0	39.3	37.2	41.7	9	12
30	29.5	31.9	30.7	34.2	8	11
40	23 4	24.9	24 3	26.9	6	11
50	17 9	18.8	18.3	20 7	5	13
60	13.2	13 7	14.2	15 6	4	10
70	8.8	9.8	10.4	11 6	11	12
80	5 4	6.7	6.9	8.2	24	19

[1] From United States Life Tables, 1930.

In spite of its greater absolute as well as relative increase in expectation of life during the past decade, the Negro population, except at birth and 60 years and over for females and at birth and 70 years and over for males, has a lower expectation of life at the present time than did the white population 40 years ago. On the basis of the mortality rates of 1939–40, white male infants could expect to live 10.6 years longer than Negro male infants and white female infants could expect to live 11.8 years longer than Negro female infants.

Perhaps a clearer appreciation of the effect of the higher mortality rates in the Negro population can be obtained by comparing the proportion of persons who would still be alive at given ages if continually subject to the mortality rates prevailing during 1939–40 from birth until the end of life. Out of 100 newborn white babies and 100 newborn Negro babies, 93 and 88, respectively, would be alive at the beginning of adult life, age 20; 83 and 63, respectively, would live until age 50; while 39 and 20 would reach 75 years of age. Although one-half of the white infants would still be alive at 71 years of age, one-half of the nonwhite infants would die before their fifty-eighth birthday.

Special interest attaches to the proportion of the population which would live to age 65 if continually subject to specified mortality rates since persons who reach this age may qualify for Social Security benefits provided they meet certain other requirements. If exposed throughout their life to the mortality rates existing in 1900 only 39 out of each 100 white male infants would reach age 65 compared with 58 which would reach this age if exposed to the mortality rates of 1939–40 (table 5).

During 1940 about 1,060,000 white male births were registered in the United States. If always exposed to current mortality rates,

TABLE 5.—*Percentage of newborn white and Negro male infants who would live until age 65 if subject throughout their lifetime to specified mortality*

Mortality rates	White	Negro
United States, 1939–40	58	37
United States, 1929–31	53	29
Registration States of 1920, 1919–21	51	34
Original registration States, 1900–02	39	19

about 614,000 would reach age 65; if exposed to the mortality rates of 40 years ago, about 413,000 would reach age 65. Thus the improvement in mortality during the past 40 years is sufficient to increase the annual number of white males reaching age 65 by about 200,000 or 1,000,000 every 5 years. This 5-year increase is nearly equivalent to the number of white male infants born in 1940. Of course neither the number of births nor the mortality rates remain fixed, but nevertheless these figures reveal the general effect of a decline in the death rate upon the potential number of claimants for old age benefits.

CHANGES IN MORTALITY RATES

All causes.—Age specific death rates more directly show the change in mortality at individual ages than does the expectation of life since the latter reflects the relative number of deaths not only at a given age but also at all older ages. Such rates for the white and Negro populations, by sex, are presented in tables 6 and 7 for the total United States for 1929-31 and 1939-40.

TABLE 6.—*Number of deaths per 1,000 population 1929–31 and 1939–40 and the percentage decrease 1929–31 to 1939–40 for white males and females*

Age	Males		Females		Percentage decrease 1929-31 to 1939-40	
	1929–31	1939–40	1929–31	1939–40	Males	Females
0 – 4	17.2	13.2	13.8	10.4	23.3	24.6
5 – 9	1.9	1.2	1.6	0.9	36.8	43.8
10–14	1.5	1.1	1.2	0.8	26.7	33.3
15–19	2.5	1.7	2.0	1.2	32.0	40.0
20–24	3.3	2.3	3.0	1.7	30.3	43.3
25–29	3.7	2.5	3.3	2.0	32.4	39.4
30–34	4.3	3.1	3.8	2.5	27.9	34.2
35–39	5.5	4.2	4.5	3.2	23.6	28.9
40–44	7.5	6.1	5.7	4.3	18.7	24.6
45–49	10.2	9.2	7.7	6.2	9.8	19.5
50–54	14.2	13.7	10.7	9.1	3.5	15.0
55–59	20.6	20.5	15.8	13.6	0.5	13.9
60–64	29.9	29.8	23.8	20.8	0.3	12.6
65–69	44.6	43.9	36.7	32.6	1.6	11.2
70–74	66.3	65.8	57.1	52.8	0.8	7.5
75–79	100.8	100.6	89.8	86.5	0.2	3.7
80–84	150.4	162.0	138.8	138.8	+7.7	0
85–89	216.2	220.6	201.5	192.4	+2.0	4.5
90 and over	306.7	313.3	294.7	287.0	+2.2	2.6
All ages.						
Crude	11.3	11.5	9.6	9.1	+1.8	5.2
Standardized[a]	12.4	11.4	10.4	8.7	8.0	16.3

[a] Total population of United States 1940 used as standard.

Table 7.—*Number of deaths per 1,000 population 1929–31 and 1939–40 and the percentage decrease 1929–31 to 1939–40 for Negro males and females*

Age	Males		Females		Percentage decrease 1929-31 to 1939-40	
	1929-31	1939-40	1929-31	1939-40	Males	Females
0 - 4	30.5	22.5	24.8	17.5	26.2	29.3
5 - 9	2.6	1.6	2.4	1.3	38.9	44.9
10-14	2.6	1.8	2.5	1.5	30.8	40.2
15-19	6.0	3.7	6.9	4.3	37.9	37.9
20-24	10.1	6.5	9.5	5.9	35.6	37.8
25-29	11.5	7.9	10.7	6.9	31.1	35.6
30-34	14.0	9.8	12.4	8.3	29.9	33.3
35-39	15.7	11.7	13.9	10.0	25.3	27.8
40-44	20.6	15.7	18.2	13.9	23.7	23.5
45-49	23.8	20.7	21.6	17.6	13.1	18.5
50-54	30.0	25.1	30.4	22.2	16.4	27.1
55-59	37.7	35.9	39.1	33.7	4.8	13.7
60-64	45.7	39.2	45.8	37.4	+14.1	18.3
65-69	59.8	70.6	56.1	53.4	+18.2	4.8
70-74	80.5	80.8	68.6	59.4	+0.4	13.4
75-79	108.0	94.3	84.5	74.7	12.7	11.6
80-84	153.8	118.3	113.5	83.8	23.1	26.2
85-89	204.7	156.9	150.3	138.3	23.3	8.0
90 and over	278.0	245.1	230.8	192.6	11.8	16.5
All ages:						
Crude	17.5	15.0	15.3	12.5	14.4	18.3
Standardized *	21.4	17.9	19.5	15.1	16.4	22.6

* Total population of United States 1940 used as standard.

The Negro population 50–74 years of age in 1940 was redistributed by 5-year age groups within this range because of the obvious concentration of population in the group 65–69 years in the enumerated population.

During the past decade the death rate of Negroes declined more rapidly than the rate of whites; for males the respective decreases were 16.4 and 8.0 percent and for females the corresponding figures were 22.6 and 16.3 percent after adjustment for differences in age composition. Nevertheless the death rate for Negro males is still 57 percent higher than the rate for white males while the rate for Negro females is 74 percent higher than the rate for white females.

The largest relative decrease in mortality rates occurred among persons less than 45 years of age. For each sex and race the rates for children, youths, and adults under 45 years of age decreased by one-fourth to one-third during the decade. After age 45 the changes were rather irregular, but in general some decrease was recorded except for white males. Beginning with the age group 55–59 years the decrease in the mortality rate of white males was insignificant, and after age 80 some increase even occurred. Although the relative decrease became smaller with advancing age, the age specific death rates of white females were lower in 1940 than in 1930 for every age group except 80–84.

The figures in table 7 undoubtedly exaggerate the improvement in the health of elderly Negroes. Presumably with the expectation that their chances of obtaining old age benefits would be increased, Negroes, especially females, reported themselves, during the enumeration of the population in 1940, as being older than they actually were. Persons as young as age 50 apparently reported their ages as 65 or more.

So many Negro females chose to report their ages as being between 65 and 70 that the death rate for that age group when computed from the reported population is actually lower than the rate for the preceding group, 60–64 years. The misstatement of age of Negro males, although not so widespread, was also clearly evident. Before the mortality rates in table 7 were computed the 1940 Negro population between 50 and 75 years of age was redistributed by 5-year age groups in an attempt to eliminate the obvious errors in the reporting of age.

When rates computed in this way are compared with the corresponding rates for 1930, the death rate for Negro males aged 65–69 in 1940 is 18.2 percent higher than the rate in 1930 and the rate for those aged 70-74 is also slightly higher in 1940 than in 1930. An investigation of the number of deaths recorded each year during the past decade revealed that the number of deaths of Negro males aged 65–69 increased sharply during 1936 and 1937 following the enactment of the Social Security Act in 1935. Prior to that time the largest number of deaths of Negro males occurred in the age group 50–54 after which the number of deaths decreased. Beginning in 1936 there have been two peaks in the distribution of deaths by age, one at 50–54 years and another at 65–69 years. There is some evidence of a corresponding misstatement of the age at death of Negro females but the error is much smaller.

It is interesting that there is a sex difference in the manner of reporting erroneous ages. The misstatement of age of Negro males has been more prevalent upon death certificates than it was at the enumeration of the population in 1940. But for Negro females the concentration of ages in the group 65–69 was much greater in the census of population than it has been upon death certificates. Since a large proportion of the ages at death of Negro males undoubtedly is reported by female members of the household, the evidence indicates that women falsify ages more readily than men. Possibly they have more to gain by so doing.

The change in the age specific death rates during the past decade is in striking contrast to the change from 1920 to 1930 (figs. 1 and 2). During the latter decade the death rates for white males aged 45 years or more and for white females aged 60 years or more actually increased. For the colored population increases in mortality rates were recorded for males 25 or more years of age and for females 35 or more years of age.

But during the past decade no definite increases in mortality were recorded except for white males more than 80 years old although the increases were insignificant for white males 55 or more years of age. For both races and for each sex during the past decade health, as measured by mortality rates, improved throughout the entire life span when compared with the preceding decade, 1920 to 1930. Death

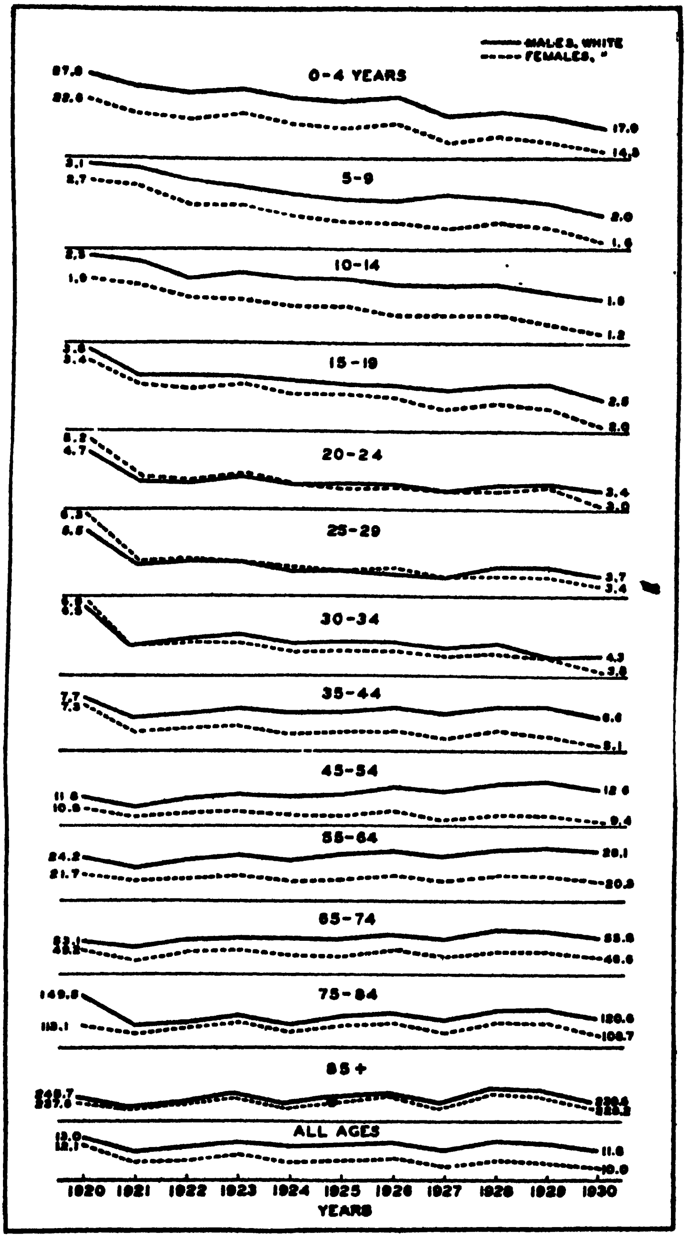

FIGURE 1.—Number of deaths per 1,000 white population by age and sex for the death registration States of 1920 from 1920 to 1930. (Semilogarithmic scale; the figures at the ends of the lines are the death rates in 1920 and 1930, respectively.)

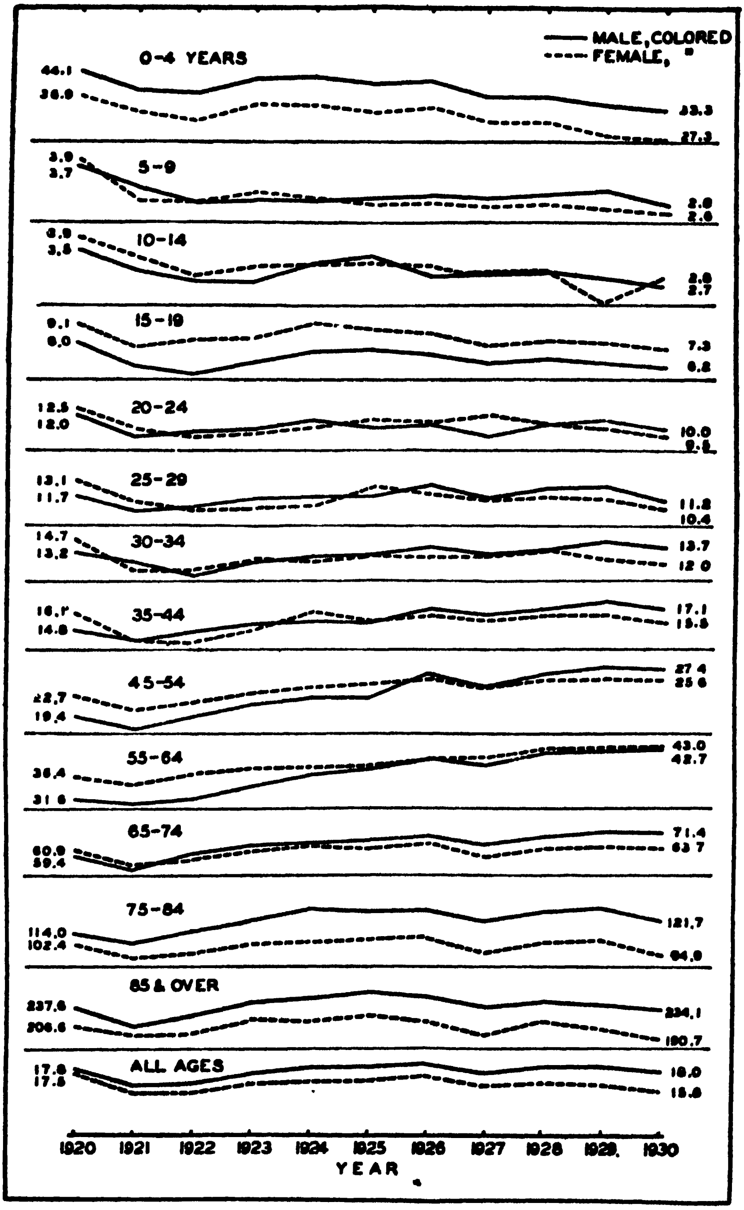

FIGURE 2.—Number of deaths per 1,000 colored population by age and sex for the death registration States of 1920 from 1920 to 1930. (Semilogarithmic scale, the figures at the ends of the lines are the death rates in 1920 and 1930, respectively.)

rates of persons in late adult life which had increased from 1920 to 1930 either decreased or, for white males over 80 years of age, increased less from 1930 to 1940. Does this mean that mortality rates of persons in late adult life have now begun to decrease although previous records indicate that, if anything, there has been some increase in such rates during the past generation?

The statement that the death rates of persons in late adult life decreased from 1930 to 1940 is just as true as the statement that the corresponding rates increased from 1920 to 1930. But will this reported decrease be more permanent than the increase which was previously reported? Although there are reasons for expecting some improvement in the health of persons in late adult life because of the marked decrease in mortality from tuberculosis and pneumonia during the past decade, it will be necessary to await the record of the present decade before definite conclusions can be established. Unfortunately the record of the present decade may be influenced by the effects of the war so that the answer to the question of whether there has been a real decline in the death rates of old persons may be postponed.

It may be desirable to point out that although the misstatement of age by persons around 65 years does affect the mortality rates at specific ages, it does not account for the reported decrease in mortality rates. Even if the 5-year age groups are combined into broader groups, the death rates still are lower in 1940 than in 1930.

The decrease in the age specific mortality rates of the population of the entire country is supported by the trend in mortality rates among industrial policyholders of the Metropolitan Life Insurance Company (table 8). In contrast to the change between 1920 and 1930, mortality rates during the past decade declined sharply at each age even in the colored group. The agreement in the trend of mortality of these urban wage earners with that of the general population gives added support to the belief that a real improvement in the health of persons in late adult life occurred between 1930 and 1940.

TABLE 8.—*Percentage decrease in the number of deaths per 1,000 population by age, sex, and color, Industrial Department, Metropolitan Life Insurance Company, 1929-31 to 1940* [1]

Age	Percentage decrease 1929-31 to 1940				Age	Percentage decrease 1929-31 to 1940			
	White		Colored			White		Colored	
	Male	Female	Male	Female		Male	Female	Male	Female
10	47	39	66	57	50	22	25	22	24
20	40	54	47	44	60	13	20	16	15
30	38	48	44	49	70	9	11	9	7
40	29	34	35	34					

[1] Computed from data in: Louis I. Dublin and Alfred J. Lotka, "Length of Life," p. 301, and Statistical Bulletin of the Metropolitan Life Insurance Co., June 1941.

Specific causes of death.—Significant decreases in mortality rates were recorded for each of the important causes of death except heart disease, cancer, and diabetes (table 9). The largest relative increase was in the death rate for diabetes which was 12 percent higher in the white and 24 percent higher in the nonwhite population in 1939 as compared with 1929–31. Smaller increases took place in the mortality rates of heart disease and cancer; the rate of the former actually decreased in the nonwhite population. The reasons for the observed increase in the death rates from cancer, heart disease, and diabetes are difficult to determine. More accurate diagnosis, a change in methods of entering the cause of death on the death certificate, and perhaps a real increase in the disease itself may all have contributed to the higher death rate.

TABLE 9.—*Number of deaths per 100,000 population from selected causes, by color, United States, 1929–31, 1939, and the percentage change 1929–31 to 1939 (rates are standardized on the total United States population 1940)*

Cause of death	White		Nonwhite		Percentage change 1929–31 to 1939	
	1929–31	1939	1929–31	1939	White	Nonwhite
Influenza	32.7	14.5	75.2	37.5	−56	−50
Pellagra	2.6	1.2	36.9	9.6	−54	−74
Diarrhea and enteritis	19.1	10.4	37.7	19.7	−46	−48
Homicide	5.6	3.2	40.0	34.2	−43	−15
Tuberculosis	60.1	37.0	205.8	133.2	−39	−35
Pneumonia	76.3	54.3	269.6	106.8	−29	−60
Cerebral hemorrhage	99.5	72.7	161.5	137.1	−27	−15
Nephritis	97.5	76.7	208.1	164.6	−21	−21
Accidents	83.5	69.8	95.7	78.1	−17	−18
Syphilis	5.4	4.5	43.7	40.3	−17	−8
All causes	1,144.5	1,006.5	2,018.8	1,603.3	−12	−21
Suicide	16.7	14.9	6.2	4.6	−11	−26
Cancer	113.9	118.4	86.0	97.1	4	13
Heart disease	244.3	273.7	333.0	308.8	12	−7
Diabetes	22.7	25.4	18.8	23.3	12	24

Large decreases were recorded in the death rates from the principal respiratory causes of death: influenza, pneumonia, and tuberculosis. The decline in the death rate from tuberculosis is a continuation of the trend observed during recent decades. The lower rate from pneumonia undoubtedly was the result, in part at least, of an increasingly widespread use of serum and drugs in the treatment of this disease. It should be noted, however, that the death rate from influenza also decreased very sharply during the past decade. Part of this decrease may be attributed to the fact that although the number of cases of influenza was higher than the average during 1939, the disease was not especially fatal so that the death rate remained relatively low.

One of the most gratifying features of the past decade was the uninterrupted decline in the maternal mortality rate which previous to 1930 had shown no decline since the birth registration area was

established in 1915. During the past decade this rate declined 48 percent among white mothers and 34 percent among nonwhite mothers. In 1940 the two rates were 3.2 and 7.7 per 1,000 live births, respectively.

The number of infant deaths dropped below 5 percent of the number of live births for the first time during the past decade. The relative decrease, 28 percent, was the same for both whites and nonwhites but the rate for the latter is still much higher than that for white infants, 74 per 1,000 live births compared with 43 per 1,000 live births.

Taken as a whole the mortality record of the past decade is one of the most favorable in the history of death registration in this country.

SUMMARY

Between 1930 and 1940 the expectation of life at birth for the total population increased from 59.0 to 63.3 years, or 7 percent. Increases occurred at each age, the average being about 5 percent.

The relative increase in life expectancy was nearly twice as great for nonwhites as for whites. The expectation of life at birth increased 3.5 and 4.3 years for white males and females but 4.4 and 5.7 years for Negro males and females. However, the life expectancy for white persons is still appreciably greater than that for nonwhite persons. The expectation of life at birth is 63 years for white males and 67 years for white females, compared with 52 years for Negro males and 55 years for Negro females.

After adjustment for changes in age distribution the death rate from all causes in 1939–40 was about 12 percent lower than the rate in 1929–31 for whites and about 20 percent lower for Negroes.

The largest relative decreases occurred in the death rates of children and young adults but significant decreases were recorded throughout the entire life span even among persons in the older age groups.

With the exception of the death rates from heart disease, cancer, and diabetes, the mortality rate for each of the important causes of death was lower in 1939 than in 1930.

For the first time in the history of the registration area, the maternal mortality rate declined uninterruptedly throughout the entire decade. The relative decrease was 48 percent among white mothers and 34 percent among nonwhite mothers.

By the end of the decade the mortality of white infants had dropped to 4 percent while that of nonwhite infants had dropped to 7 percent.

IXODES BAERGI, A NEW SPECIES OF TICK FROM ARKANSAS (ACARINA: IXODIDAE)[1]

By R. A. Cooley, *Senior Entomologist*, and Glen M. Kohls, *Associate Entomologist, United States Public Health Service*

Ixodes baergi n. sp.

Capitulum, scutum, legs, and coxae in both sexes only moderately sclerotized; color yellow.

FEMALE

Body.—(Described from well-engorged specimens.) Slightly panduriform because of lateral constrictions at the spiracular plates. Size from 6.5 mm. by 4.0 mm. to 7.5 mm. by 4.5 mm.

Capitulum.—Length (measured from posterior margin of basis capituli to tip of hypostome), 0.495 mm.; width, 0.45 mm. Basis capituli rounded at the sides, posterior margin straight or undulate; cornua absent. Porose areas large, nearly circular, depressed, reaching nearly to the posterior margin, separated by about the diameter of one. Palpi short, broad, tumescent dorsally and with a few fine hairs; article 1 simple. Basis, ventrally, narrower behind, lacking definite constrictions at the sides and limited behind by a faint, posteriorly directed, curved ridge. Auriculae suggested by faint, short, curved ridges.

Hypostome.—Short, broad, rounded apically; denticles 3/3 except near the base where they are 2/2. Length about 0.21 mm.

Scutum.—Longer than wide, widest before the middle, broadly rounded posteriorly. Scapulae short, blunt. Cervical grooves moderately deep, broad, little curved, and nearly parallel. Lateral carinae faint or absent. Surface impunctate; irregular, especially in the antero-lateral areas. Hairs few, small; absent in many specimens. Size range in 6 specimens, 0.84 mm. by 0.72 mm. to 0.96 mm. by 0.90 mm.

Legs.—Moderate in length and size and with a few short hairs. All tarsi with mild, subterminal humps. Length of tarsus I, 0.51 mm.; metatarsus, 0.45 mm. Length of tarsus IV, 0.54 mm.; metatarsus, 0.465 mm.

Coxae.—Without spurs, smooth, impunctate, with a few faint hairs.

Spiracular plate.—Elliptical, with the longer axis directed dorsoventrally. Macula a little eccentric on the anterior side. Goblets moderate in number. Greatest length, 0.27 mm.

Sexual opening.—Placed slightly posterior to coxae II.

[1] From the Rocky Mountain Laboratory (Hamilton, Montana), Division of Infectious Diseases, National Institute of Health.

MALE

Body.—Oval, a little narrower in front. Length, excluding capitulum, 2.37 mm., width, 1.56 mm.

Capitulum.—Length (from posterior margin of basis capituli to tip of hypostome), 0.36 mm.; width (posterior portion of basis), 0.225 mm. Basis distinctly elevated over the level of the mouth parts. Posterior margin straight or a little curved, salient; sides curved. Cornua absent. Surface irregular, finely punctate (some specimens show only very faint punctations). Palpi short, broad, tumescent, and with a few hairs; surface irregular. Palpal article 1 simple. Length of articles 2 and 3 combined, 0.18 mm., width, 0.12 mm. Basis, ventrally, merges into the "neck" without a ventral ridge, though there are a few faint, transverse wrinkles. Auriculae absent.

Hypostome.—Short, broad, and cleft apically. Denticles arranged 3/3, those of the lateral files pointed, those of the median files rounded. Length about 0.15 mm.

Scutum.—Cervical grooves broad, shallow, straight, divergent, about as long as the interval of the emargination. Two faintly depressed areas of irregular shape, one on each side posterior to the cervical groove. Scapulae moderate in length, blunt. Surface, especially pseudoscutal area, shining, faintly shagreened. Punctations numerous, small, about equal in size throughout or tending to be a little larger near the lateral margins. Hairs few and small.

Legs and coxae.—Essentially as in the female. Length of tarsus I, 0.42 mm.; metatarsus, 0.36 mm. Length of tarsus IV, 0.45 mm.; metatarsus, 0.315 mm.

Plates.—Median plate longer than the anal plate. Sutural line between median and adanal plates indistinct. All plates with fine punctations and with a few fine hairs.

Spiracular plate.—Subcircular with the macula placed a little eccentric on antero-ventral side. Surface level. Greatest length, 0.225 mm.

Sexual opening.—Placed at the level of the intervals between coxae II and III.

Nymphs and larvae unknown.

Described from numerous females and males from cliffs inhabited by a colony of cliff swallows, Washington County, Ark., June 21, 1941, A. P. 19248, collected by Dr. W. J. Baerg.

Holotype.—Female.

Allotype.—Male.

Paratypes.—12 females, 12 males.

Holotype and allotype preserved in the collections of the Rocky Mountain Laboratory. One pair of paratypes has been sent to each of the following: United States National Museum, Washington, D. C.;

FIGURE 1. *Ixodes baergi* n. sp. A. Dorsal view of anterior end of engorged female. B. Same in ventral view. C. Male, dorsal view. D. Male, ventral view.

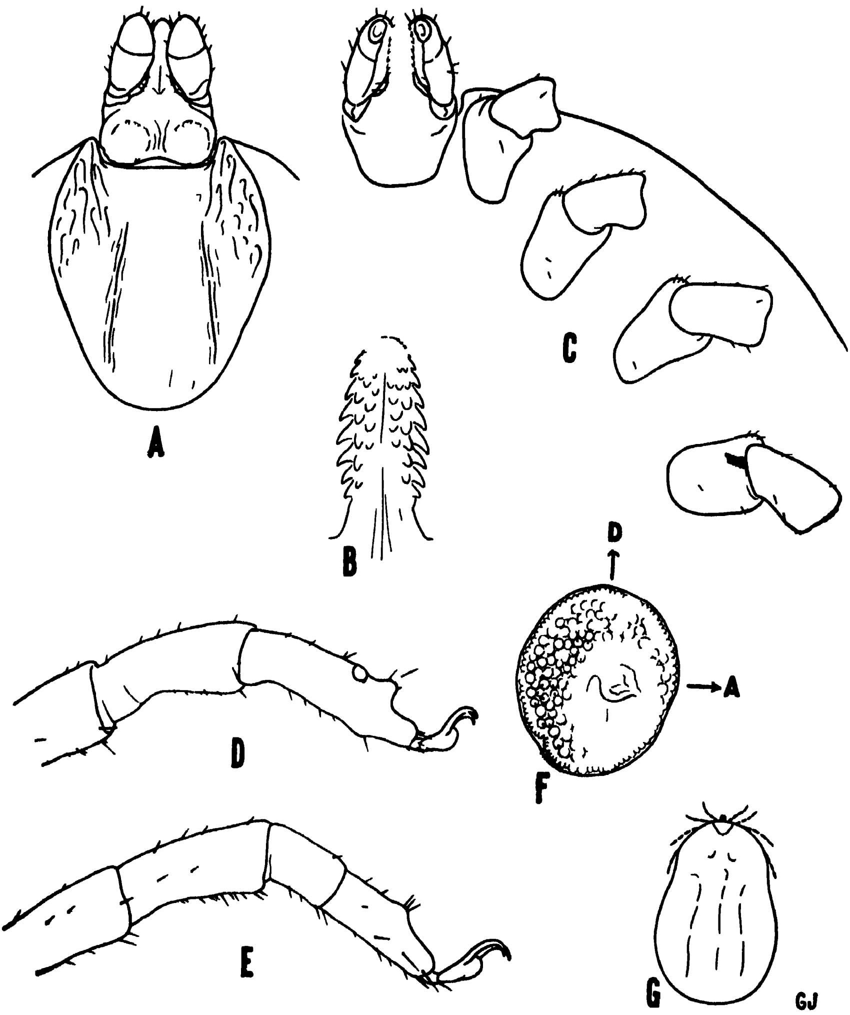

FIGURE 2.—*Ixodes baergi* n. sp., female. A. Capitulum and scutum. B. Hypostome. C. Capitulum and coxae. D. Tarsus and metatarsus of leg I. E. Tarsus and metatarsus of leg IV. F. Spiracular plate. G. Engorged specimen.

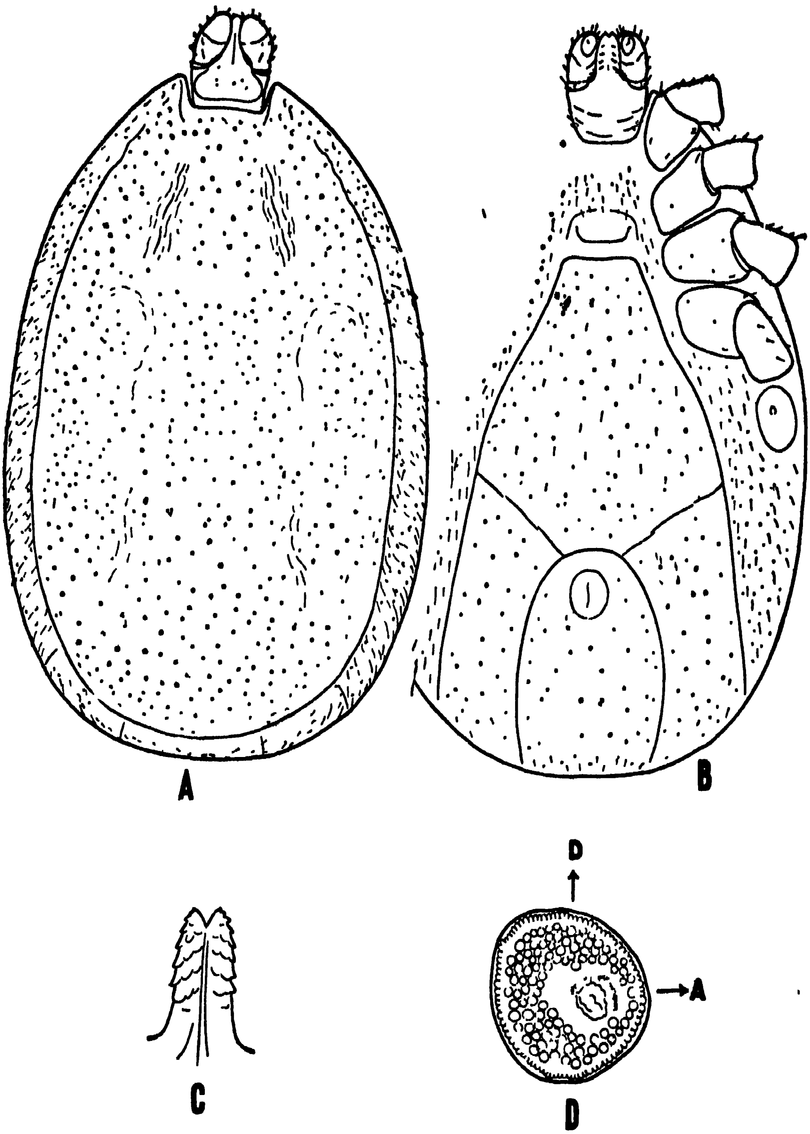

FIGURE 3.—*Ixodes baergi* n. sp., Male. A. Capitulum and scutum. B. Capitulum, coxae and plates. C. Hypostome. D. Spiracular plate.

Bureau of Entomology and Plant Quarantine, Washington, D. C.; Zoological Division, Bureau of Animal Industry, Washington, D. C.; Department of Entomology, College of Agriculture, Fayetteville, Ark.; Museum of Comparative Zoology, Harvard University, Cambridge, Mass.; Division of Entomology and Parasitology, University of California, Berkeley, Calif.; Division of Entomology and Economic Zoology, University of Minnesota, Minneapolis, Minn.; Department of Entomology, Cornell University, Ithaca, N. Y.

This new species resembles *canisuga* Johnston, an Old World tick occurring on dog and various other hosts, including "sand martin." It differs from *canisuga* by several characters, including the following: In the new species the surface of the scutum of the female is impunctate, irregular with faint wrinkles or rugae, while in *canisuga* it is smooth, punctate, bright and shining. In *baergi* the porose areas are large, concave and shallow, while in *canisuga* they are smaller and deeper. In *baergi* the female hypostome measures 0.21 mm., while in *canisuga* it is more than 50 percent longer, measuring 0.36 mm. Descriptions of the *canisuga* male do not reveal distinct differences between it and *baergi*.

The new species also resembles *marxi* Banks, an American tick fairly common on *Sciurus*. In *baergi* the scutum of the female is smaller than in *marxi*. In *baergi* porose areas are large, circular, and shallow while in *marxi* they are small, irregular, and deep. The males of *marxi* are proportionately narrower than those of *baergi* and have the scutum coarsely punctate.

DEATHS DURING WEEK ENDED NOVEMBER 21, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov. 21, 1942	Corresponding week 1941
Data from 88 large cities of the United States:		
Total deaths	9,115	8,354
Average for 3 prior years	8,137	------
Total deaths, first 46 weeks of year	384,785	383,150
Deaths per 1,000 population, first 46 weeks of year, annual rate	11.7	11.6
Deaths under 1 year of age	587	528
Average for 3 prior years	506	------
Deaths under 1 year of age, first 46 weeks of year	26,567	24,298
Data from industrial insurance companies:		
Policies in force	65,252,281	64,655,900
Number of death claims	12,092	10,168
Death claims per 1,000 policies in force, annual rate	9.7	8.2
Death claims per 1,000 policies, first 46 weeks of year, annual rate	9.1	9.4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED NOVEMBER 28, 1942

Summary

The incidence of meningococcus meningitis increased during the week from 64 to 93 cases, the largest number reported for the corresponding week of any other year since 1936 (94 cases). The total number of cases (3,196) reported to date is above that recorded for the corresponding period of any other year since 1937, when 4,998 cases had been reported. The largest numbers of cases were reported in the Middle Atlantic (22 cases), South Atlantic (19), and New England States (15), and the highest incidence rates are shown for the New England and South Atlantic areas. The other cases are fairly well distributed geographically. The following named States reported the largest numbers of cases: New York 9, California 8, New Jersey 7, Pennsylvania and Maryland 6 each.

A total of 69 cases of poliomyelitis was reported, as compared with 100 for the preceding week. Texas reported 17 cases and California 13. No other State reported more than 4 cases.

The incidence of influenza increased slightly—from 1,769 last week to 1,854 for the current week. Of these, Texas reported 539, South Carolina 435, and Virginia 344, or 71 percent of the total in these three States. The current incidence for the country as a whole, however, is below that for the corresponding week of any prior year since 1938.

Of the 9 important communicable diseases included in the following table, and for which comparable weekly reports are available for prior years, the current incidence of only one, meningococcus meningitis, is above the 5-year (1937–41) median expectancy.

Other reports for the week include 1 case of anthrax (in Massachusetts), 10 scattering cases of infectious encephalitis, 1 case of

Rocky Mountain spotted fever (in Indiana), 12 cases of smallpox (8 of which were in the East North Central States), 18 cases of tularemia (12 in the East North Central area), and 63 cases of endemic typhus fever (26 in Georgia and 14 in Texas).

Report of 1 human case of plague in California was received during the week.[1]

The death rate for the current week for 88 large cities in the United States is 11.9 per 1,000 population, as compared with 12.7 last week and a 3-year (1939–41) average of 11.8. The accumulated rate to date is 11.7 as compared with 11.6 for the corresponding period in 1941.

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[1] See p. 1879.

Telegraphic morbidity reports from State health officers for the week ended November 28, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended— Nov. 28, 1942	Week ended— Nov. 29, 1941	Median 1937-41	Week ended— Nov. 28, 1942	Week ended— Nov. 29, 1941	Median 1937-41	Week ended— Nov. 28, 1942	Week ended— Nov. 29, 1941	Median 1937-41	Week ended— Nov. 28, 1942	Week ended— Nov. 29, 1941	Median 1937-41
NEW ENG.												
Maine	0	0	0	-----	-----	1	0	281	47	7	0	0
New Hampshire	0	0	0	2	-----	-----	48	11	2	1	0	0
Vermont	0	0	0	2	-----	-----	103	0	19	0	0	0
Massachusetts	0	4	4	-----	-----	-----	285	134	143	4	2	1
Rhode Island	0	1	1	-----	-----	-----	2	20	4	3	0	0
Connecticut	0	1	1	3	3	3	176	86	30	0	2	1
MID. ATL.												
New York	14	14	17	19	14	17	257	263	263	9	12	5
New Jersey	2	4	9	12	15	7	27	22	22	7	2	1
Pennsylvania	9	12	38	4	-----	-----	407	280	289	6	5	2
E. NO. CEN.												
Ohio	20	21	21	14	13	13	34	25	25	2	1	1
Indiana	5	16	22	3	30	8	13	21	19	1	1	1
Illinois	17	30	42	15	14	12	35	31	31	5	2	1
Michigan [3]	8	12	13	1	1	1	62	63	93	4	2	1
Wisconsin	0	0	1	31	17	25	38	125	91	1	1	0
W. NO. CEN.												
Minnesota	0	3	4	-----	-----	-----	3	53	70	0	1	1
Iowa	6	5	6	2	-----	1	39	24	20	0	1	1
Missouri	9	10	16	3	2	2	7	11	12	1	0	0
North Dakota	6	3	2	-----	16	8	1	70	5	0	0	0
South Dakota	11	6	6	-----	-----	-----	14	6	2	0	0	0
Nebraska	5	4	4	-----	-----	-----	81	3	2	0	0	0
Kansas	6	7	7	3	5	5	20	12	17	0	1	1
SO. ATL.												
Delaware	0	0	0	-----	2	-----	1	2	2	0	0	0
Maryland [3]	6	8	9	4	5	5	22	97	6	6	2	1
Dist. of Col	1	0	0	1	1	1	2	4	1	3	1	0
Virginia	41	27	35	344	184	107	17	117	20	6	2	2
West Virginia	10	7	13	18	13	11	1	180	18	1	0	1
North Carolina	35	70	69	2	1	3	3	416	189	2	0	1
South Carolina	17	11	11	435	378	290	2	12	11	1	1	1
Georgia	21	19	20	6	40	24	1	35	7	0	0	1
Florida	3	8	8	1	-----	7	8	6	6	0	2	0
E. SO. CEN.												
Kentucky	10	13	15	8	2	10	18	87	73	2	4	1
Tennessee	9	16	18	15	43	43	11	30	18	0	1	1
Alabama	15	36	34	27	97	81	3	41	21	1	0	2
Mississippi	7	15	15	-----	-----	-----	-----	-----	-----	1	1	1
W. SO. CEN.												
Arkansas	15	17	17	60	82	46	7	26	8	2	1	1
Louisiana	4	8	19	3	16	6	1	2	1	0	1	0
Oklahoma	11	21	19	29	120	69	0	30	1	0	1	1
Texas	43	67	54	539	1,088	252	5	141	24	4	0	0
MOUNTAIN												
Montana	0	0	0	5	8	8	13	25	16	0	0	0
Idaho	0	4	0	-----	4	-----	15	10	10	1	0	0
Wyoming	0	3	1	96	2	-----	15	1	1	1	0	0
Colorado	10	14	7	43	33	9	13	128	39	1	1	1
New Mexico	0	4	4	1	2	1	3	0	3	0	1	0
Arizona	0	1	6	52	148	101	6	22	13	0	0	0
Utah [3]	0	0	0	3	1	7	313	62	15	0	0	0
Nevada	0	0	-----	-----	-----	-----	16	0	-----	0	0	-----
PACIFIC												
Washington	2	2	2	1	-----	-----	238	11	11	2	0	0
Oregon	1	3	3	26	28	23	202	58	19	0	1	1
California	20	18	26	36	70	33	60	446	149	8	0	0
Total	399	545	718	1,854	2,478	1,999	2,648	3,539	3,539	93	53	37
47 weeks	13,851	14,789	21,013	96,491	509,136	182,210	483,286	843,607	361,420	3,196	1,849	1,849

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 28, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Nov. 28, 1942	Nov. 29, 1941		Nov. 28, 1942	Nov. 29, 1941		Nov. 28, 1942	Nov. 29, 1941		Nov. 28, 1942	Nov. 29, 1941	
NEW ENG.												
Maine	0	0	0	8	13	13	0	0	0	0	0	1
New Hampshire	0	0	0	17	10	5	0	0	0	0	0	0
Vermont	0	0	0	3	2	9	0	0	0	1	0	0
Massachusetts	0	1	0	183	203	124	0	0	0	0	2	1
Rhode Island	0	0	0	5	6	6	0	0	0	1	0	0
Connecticut	0	2	0	25	19	39	0	0	0	0	0	1
MID. ATL.												
New York	3	17	7	122	205	233	0	0	0	3	16	10
New Jersey	1	6	1	62	101	101	0	0	0	2	1	1
Pennsylvania	2	3	5	153	188	210	0	0	0	7	7	11
E. NO. CEN.												
Ohio	1	5	2	367	240	240	1	2	0	3	16	2
Indiana	0	3	2	37	100	122	4	0	3	1	4	3
Illinois	3	6	3	141	170	292	2	0	0	3	2	6
Michigan [2]	1	1	2	104	231	231	1	0	3	2	1	3
Wisconsin	2	1	1	206	135	154	0	2	3	0	1	1
W. NO. CEN.												
Minnesota	4	1	2	63	54	82	0	0	10	1	0	0
Iowa	1	1	1	56	38	65	0	0	2	0	0	1
Missouri	3	1	2	58	87	86	2	5	4	0	7	6
North Dakota	0	0	0	6	14	20	0	1	1	0	0	0
South Dakota	0	0	0	29	15	26	0	0	1	0	0	0
Nebraska	2	0	0	16	27	20	0	0	0	0	0	0
Kansas	2	1	1	68	76	112	0	1	1	3	1	1
SO. ATL.												
Delaware	0	0	0	6	21	14	0	0	0	0	0	0
Maryland [3]	0	4	0	28	50	50	0	0	0	0	5	4
Dist. of Col	0	1	0	21	18	14	0	0	0	1	1	0
Virginia	2	5	2	61	50	50	0	0	0	11	11	4
West Virginia	0	1	1	49	72	88	0	0	0	1	0	4
North Carolina	4	1	1	95	108	84	0	0	0	3	3	2
South Carolina	0	0	0	16	12	14	0	0	0	4	4	0
Georgia	0	4	1	40	47	27	0	0	0	1	5	6
Florida	1	0	0	12	4	7	0	0	0	2	1	1
E. SO. CEN.												
Kentucky	0	4	2	57	90	90	0	0	0	2	7	4
Tennessee	3	13	2	92	85	58	0	0	0	1	6	4
Alabama	0	8	2	30	42	34	0	0	0	1	3	5
Mississippi	0	2	2	17	22	15	0	0	0	2	3	3
W. SO. CEN.												
Arkansas	0	1	1	15	18	20	0	2	2	2	5	5
Louisiana	0	1	1	4	7	12	0	0	0	1	8	8
Oklahoma	0	2	0	17	22	27	0	1	4	0	7	7
Texas	17	2	2	26	54	68	1	0	0	2	7	18
MOUNTAIN												
Montana	2	0	0	14	18	29	1	0	0	0	0	0
Idaho	0	1	0	5	10	15	0	0	0	0	0	0
Wyoming	0	0	0	3	5	5	0	0	0	0	0	0
Colorado	0	1	1	29	24	26	0	0	1	0	0	1
New Mexico	0	0	0	5	11	11	0	0	0	1	2	2
Arizona	0	1	0	4	3	5	0	0	0	1	1	1
Utah [3]	0	0	0	13	20	18	0	0	0	2	0	1
Nevada	0	0	------	0	0	-------	0	0	------	0	0	------
PACIFIC												
Washington	0	3	2	29	39	35	0	0	3	1	3	2
Oregon	2	0	0	18	6	25	0	5	4	0	0	1
California	13	8	8	160	111	140	0	0	2	5	3	4
Total	69	112	112	2,595	2,903	3,354	12	19	60	71	143	155
47 weeks	3,902	8,800	8,800	113,154	112,982	143,545	719	1,261	9,122	6,375	8,028	12,077

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended November 28, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Whooping cough		Week ended Nov. 28, 1942								
	Week ended—		Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	Nov. 28, 1942	Nov. 29, 1941		Amebic	Bacillary	Unspecified					
NEW ENG.											
Maine	66	19	0	0	0	0	0	0	0	0	0
New Hampshire	9	5	0	0	0	0	0	0	0	0	0
Vermont	44	34	0	0	0	0	0	0	0	0	0
Massachusetts	205	207	1	0	6	0	0	0	0	0	0
Rhode Island	22	59	0	0	0	0	0	0	0	0	0
Connecticut	73	64	0	1	0	0	0	0	0	0	0
MID. ATL.											
New York	439	619	0	4	15	0	1	0	0	0	1
New Jersey	189	214	0	1	0	0	0	0	0	0	0
Pennsylvania	344	183	0	0	2	0	0	0	0	5	0
E. NO. CEN.											
Ohio	211	159	0	0	0	0	0	0	0	3	0
Indiana	25	34	0	0	0	0	0	0	1	1	0
Illinois	163	270	0	0	1	0	1	0	0	6	0
Michigan [2]	286	415	0	0	1	0	0	0	0	2	0
Wisconsin	215	287	0	0	0	0	0	0	0	0	0
W. NO. CEN.											
Minnesota	26	69	0	5	0	0	0	0	0	0	0
Iowa	12	10	0	0	0	0	0	0	0	0	0
Missouri	13	36	0	0	0	0	0	0	0	0	0
North Dakota	5	10	0	0	0	0	0	0	0	0	0
South Dakota	3	2	0	0	0	0	0	0	0	0	0
Nebraska	2	2	0	0	0	0	0	0	0	0	0
Kansas	48	34	0	0	0	0	1	0	0	0	0
SO. ATL.											
Delaware	14	3	0	0	0	0	0	0	0	0	0
Maryland [2]	82	46	0	0	0	1	0	0	0	0	1
Dist. of Col	20	32	0	0	0	0	0	0	0	0	0
Virginia	37	58	0	0	0	22	0	0	0	0	0
West Virginia	26	18	0	0	0	0	[illegible]	0	0	0	0
North Carolina	77	156	0	0	1	0	0	0	0	0	0
South Carolina	31	28	0	2	10	0	0	0	0	0	5
Georgia	24	29	0	0	7	0	0	0	0	0	25
Florida	9	9	0	0	0	0	0	0	0	0	2
E. SO. CEN.											
Kentucky	20	57	0	0	1	0	0	0	0	0	0
Tennessee	55	59	0	0	0	1	0	0	0	1	2
Alabama	17	13	0	1	0	0	1	0	0	0	8
Mississippi	-------	-------	0	0	0	0	0	0	0	0	2
W. SO. CEN.											
Arkansas	27	20	0	0	2	0	0	0	0	0	1
Louisiana	4	4	0	6	1	0	1	0	0	0	0
Oklahoma	5	16	0	0	0	0	0	0	0	0	0
Texas	128	69	0	2	103	0	3	0	0	0	14
MOUNTAIN											
Montana	16	9	0	0	0	0	0	0	0	0	0
Idaho	0	16	0	0	0	0	0	0	0	0	0
Wyoming	5	12	0	0	0	0	0	0	0	0	0
Colorado	12	45	0	1	0	0	0	0	0	0	0
New Mexico	2	18	0	0	3	0	0	0	0	0	0
Arizona	4	14	0	0	0	16	1	0	0	0	0
Utah [2]	14	20	0	0	0	1	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	28	106	0	0	0	0	0	0	0	0	0
Oregon	2	51	0	1	0	0	0	0	0	0	0
California	184	182	0	3	13	0	1	0	0	0	1
Total	3,243	3,822	1	27	166	41	10	0	1	18	63
47 weeks	162,372	191,546									

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended November 14, 1942

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Atlanta, Ga	2	0	4	0	0	1	6	0	15	0	1	2
Baltimore, Md	1	0	1	0	0	3	14	0	15	0	1	69
Barre, Vt	0	0	----	0	57	0	0	0	0	0	0	0
Billings, Mont	0	0	----	0	0	0	2	0	1	0	0	0
Birmingham, Ala	1	0	1	1	0	0	3	0	4	0	1	2
Boise, Idaho	0	0	----	0	0	0	0	0	0	0	0	0
Boston, Mass	0	0	----	0	3	0	12	0	52	0	0	51
Bridgeport, Conn	0	0	1	1	0	1	1	0	2	0	0	0
Brunswick, Ga	0	0	----	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	----	2	23	0	10	0	0	0	0	22
Camden, N. J	0	0	----	0	0	0	1	0	0	0	0	8
Charleston, S. C	2	0	5	0	0	0	3	0	1	0	0	0
Chicago, Ill	20	1	6	4	11	2	22	1	50	0	0	86
Cincinnati, Ohio	1	0	----	1	3	0	3	2	13	0	0	6
Cleveland, Ohio	2	0	2	1	4	1	4	0	37	0	0	70
Columbus, Ohio	0	0	1	1	0	0	1	0	21	0	0	4
Concord, N. H	0	0	----	0	0	0	0	0	0	0	0	1
Cumberland, Md	0	0	----	0	0	0	1	0	0	0	0	0
Dallas, Texas	1	0	2	2	0	0	0	0	4	0	0	1
Denver, Colo	7	0	11	0	1	1	5	1	10	0	0	4
Detroit, Mich	2	0	----	0	4	1	16	0	27	0	0	65
Duluth, Minn	0	0	----	0	0	0	0	0	2	0	0	1
Fall River, Mass	0	0	----	0	0	0	1	0	3	0	0	4
Fargo, N. Dak	0	0	----	0	0	0	1	0	3	0	0	0
Flint, Mich	0	0	----	0	1	2	5	0	7	0	0	20
Fort Wayne, Ind	0	0	----	0	0	0	1	0	0	0	0	0
Frederick, Md	0	0	----	0	0	0	0	0	0	0	0	0
Galveston, Texas	0	0	----	0	0	0	1	0	0	0	0	0
Grand Rapids, Mich	0	0	----	0	3	0	0	0	0	0	0	6
Great Falls, Mont	0	0	----	0	0	0	1	0	2	0	0	4
Hartford, Conn	0	0	----	0	0	0	5	0	2	0	0	10
Helena, Mont	0	0	----	0	0	0	0	0	0	0	0	0
Houston, Tex	4	0	----	0	0	0	1	0	0	0	0	0
Indianapolis, Ind	0	0	----	0	4	0	6	0	19	0	0	14
Kansas City, Mo	1	0	----	0	1	0	11	0	22	0	0	3
Kenosha, Wis	0	0	----	0	0	0	0	0	1	0	0	1
Little Rock, Ark	0	0	----	0	0	0	3	0	0	0	0	0
Los Angeles, Calif	2	0	11	0	5	3	9	4	18	0	0	14
Lynchburg, Va	0	0	----	0	0	0	0	0	0	0	0	2
Memphis, Tenn	0	0	3	1	0	0	3	0	9	0	1	9
Milwaukee, Wis	0	0	2	2	22	0	2	0	27	0	0	26
Minneapolis, Minn	0	0	----	0	2	0	3	1	18	0	0	6
Missoula, Mont	0	0	----	0	0	0	0	0	0	0	0	1
Mobile, Ala	1	0	----	0	0	0	0	0	1	0	0	0
Nashville, Tenn	0	0	----	1	0	0	1	0	7	0	0	0
Newark, N. J	0	0	7	0	7	0	3	0	7	0	0	19
New Haven, Conn	0	0	----	0	0	1	0	0	2	0	0	8
New Orleans, La	2	0	----	0	0	0	1	0	6	0	0	4
New York, N. Y	16	0	12	1	14	7	64	0	108	0	2	112
Omaha, Nebr	2	0	----	0	0	0	3	0	2	1	0	0
Philadelphia, Pa	2	0	2	2	148	3	35	0	33	0	2	123
Pittsburgh, Pa	1	0	----	0	1	0	12	0	10	0	0	17
Portland, Maine	0	0	----	0	0	4	5	0	4	0	0	7
Providence, R. I	4	0	1	0	0	0	5	0	2	0	1	20
Pueblo, Colo	0	0	----	0	0	0	2	0	1	0	0	0
Racine, Wis	0	0	----	0	1	0	0	0	6	1	0	1
Raleigh, N. C	0	0	----	0	0	0	3	0	0	0	0	0
Reading, Pa	0	0	----	0	1	0	0	0	0	0	0	9
Richmond, Va	1	0	----	0	0	0	2	0	8	0	0	5

City reports for week ended November 14, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Roanoke, Va.	0	0		0	0	0	0	0	1	0	0	0
Rochester, N. Y.	1	0		0	1	0	2	0	11	0	0	16
Sacramento, Calif.	2	0		0	2	0	4	0	0	0	0	1
Saint Joseph, Mo.	0	0		0	0	0	1	0	0	0	0	0
Saint Louis, Mo.	0	1	2	1	2	0	5	0	8	0	1	1
Saint Paul, Minn.	0	0		1	0	0	5	0	6	0	0	21
Salt Lake City, Utah	1	0		1	79	0	1	0	6	0	0	3
San Antonio, Tex.	0	0		0	0	0	3	0	0	0	0	1
San Francisco, Calif.	2	0	6	0	4	0	7	0	8	0	0	13
Savannah, Ga.	0	0	8	1	0	0	2	0	1	0	0	3
Seattle, Wash.	2	0		1	7	0	4	0	1	0	0	4
Shreveport, La.	1	0		0	0	0	0	0	2	0	0	0
South Bend, Ind.	0	0		0	0	0	0	0	0	0	0	3
Spokane, Wash.	0	0	1	1	22	0	0	0	4	0	0	0
Springfield, Ill.	0	0		0	0	0	0	0	1	0	1	3
Springfield, Mass.	1	0		0	4	0	4	0	41	0	0	2
Superior, Wis.	0	0		0	0	0	0	0	2	0	0	3
Syracuse, N. Y.	0	0		0	0	1	2	0	0	0	0	25
Tacoma, Wash.	0	0		0	39	0	3	0	0	0	0	0
Tampa, Fla.	0	0		0	0	0	4	0	0	0	0	0
Terre Haute, Ind.	0	0		0	0	0	1	0	0	0	0	0
Topeka, Kans.	0	0		0	1	0	0	0	4	0	0	0
Trenton, N. J.	0	0	1	0	1	0	1	0	4	0	0	7
Washington, D. C.	0	1	2	1	3	0	7	0	19	0	0	12
Wheeling, W. Va.	0	0		0	0	0	2	0	1	0	0	5
Wichita, Kans.	0	0		0	0	0	0	0	4	0	0	5
Wilmington, Del.	0	0		0	0	0	0	0	0	0	0	0
Wilmington, N. C.	3	0		0	0	0	2	1	0	0	0	5
Winston-Salem, N. C.	0	0		0	0	0	2	0	0	0	0	0
Worcester, Mass.	0	0		0	0	0	5	0	11	0	0	6

Dysentery, amebic.—Cases: Los Angeles, 1; New York, 2.
Dysentery, bacillary.—Cases: Baltimore, 1; Charleston, S. C., 2; Chicago, 1; Fall River, 1; Los Angeles, 5; New York, 15; St. Louis, 3; Shreveport, 1.
Typhus fever.—Cases: Atlanta, 5; Charleston, S. C., 1; Nashville, 5; New Orleans, 2; Savannah, 4; Shreveport, 1.

Rates (annual basis) per 100,000 population, for the group of 89 cities in the preceding table (estimated population, 1942, 34,064,594)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Nov. 14, 1942	13.47	14.08	4.13	73.63	55.11	100.75	0.31	1.68	149.40
Average for week 1937–41	19.96	15.47	[1] 3.39	[2] 86.94	[1] 51.28	111.38	0.62	4.64	164.90

[1] 3-year average, 1939–41.
[2] Median.

HUMAN CASE OF PLAGUE IN SISKIYOU COUNTY, CALIFORNIA

Under date of November 20, 1942, a case of human plague was reported in Siskiyou County, California, in a child 2½ years of age, with onset on November 8 or 9. Diagnosis has been confirmed at the United States Plague Laboratory, San Francisco, California.

The family lived about 5 miles from Yreka and owned numerous dogs and cats. Examination of four other children revealed no evidence of flea bites. Evidence of mice infestation was found in the home. There were no visible signs of the presence of ground squirrels, but the ground was covered with snow and the weather was cold. It was reported that ground squirrels were in evidence until the weather changed about a week prior to the onset of the disease. For two weeks prior to the child's illness, the father of the patient had been hauling hay from a known rodent plague area and the patient had played in this hay. The father stated that pack rats frequented the barn.

Two fatal cases of plague in human beings occurred in Siskiyou County in 1941, both in children.[1] One was in a 10-year-old boy living near Montague; the other in a 5-year-old boy living 1 mile northwest of Mount Shasta City, about 50 miles from the locality in which the first case occurred. Subsequently, plague infection was found in several pools of fleas taken from ground squirrels in various localities in Siskiyou County.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—During the week ended November 14, 1942, 26 rats found in Paauhau area, Hamakua District, Island of Hawaii, T. H., have been proved positive for plague.

Panama Canal Zone

Notifiable diseases.—August 1942.—During the month of August 1942, certain notifiable diseases were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Panama		Colon		Canal Zone		Outside the Zone and terminal cities		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chickenpox	15		6		8		2		31	
Diphtheria	12	2	4		2		3	1	21	3
Dysentery (amebic)	5		3		5		4		17	
Dysentery (bacillary)							1	2	1	2
Leprosy	1							1	1	1
Malaria [1]	11	1	8		739	2	221	6	979	9
Measles	2		2		42		11		57	
Meningitis, meningococcus			1		2				3	
Mumps	2				5				7	
Paratyphoid fever					2				2	
Pneumonia		14		13	88			4	[2] 88	31
Relapsing fever	1						1		2	
Tuberculosis		17		6	3	2		2	[2] 3	27
Typhoid fever	1						3		4	
Whooping cough					10				[2] 10	

[1] Includes 213 recurrent cases.
[2] Cases reported in the Canal Zone only.

[1] Pub. Health Rep., 57: 903 (1942).

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended October 31, 1942.—During the week ended October 31, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		1		3	2				1	7
Chickenpox		4		156	199	77	40	42	63	581
Diphtheria	9	18	4	57	1	9			2	100
Dysentery				52		2				54
Encephalomyelitis							1			1
German measles		2		29	8		3	1	6	49
Influenza		2			11				45	58
Measles				165	33	7	16	2		223
Mumps		14		118	164	23	82	25	194	620
Pneumonia		2			17				33	52
Poliomyelitis		1		3	1		1		3	9
Scarlet fever		7	8	103	101	25	19	25	36	324
Smallpox							1			1
Tuberculosis	5	18	9	150	43	16	2	29	29	301
Typhoid and paratyphoid fever			3	16	1					20
Undulant fever					1				1	2
Whooping cough		4	1	179	96	17	4	8	18	327
Other communicable diseases		1		5	210	31	4		9	260

FRANCE

Vital statistics—Years 1939, 1940, and 1941.—The following table shows the numbers of births, deaths, and marriages in France, exclusive of Alsace-Lorraine, for the years 1939, 1940, and 1941, as given in the May issue of the monthly statistical bulletin of the League of Nations and the June issue of the Droit Social:

	1939	1940	1941
Number of marriages	277,300	169,800	217,200
Marriages per 1,000 inhabitants	6.2	4.2	
Number of births	620,000	584,900	493,500
Births per 1,000 inhabitants	14.6	13.3	
Number of deaths	622,000	734,900	660,600

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

New Caledonia—Noumea (vicinity of).—On November 10, 1942, 1 death from bubonic plague was reported as having occurred about 15 miles north of Noumea, New Caledonia.

Palestine—Jaffa.—During the week ended November 14, 1942, 1 fatal case of plague was reported in Jaffa, Palestine. All possible precautions are being taken against the spread of the disease.

Typhus Fever

Irish Free State—Galway County—Galway.—Typhus fever has been reported in Galway, Galway County, Irish Free State as follows: week ended October 24, 1942, 1 case; week ended October 31, 1942. 3 cases.

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

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young rats rec

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Public Health Reports

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LESIONS IN RATS GIVEN SULFAGUANIDINE IN PURIFIED DIETS[1]

By L. L. ASHBURN, *Passed Assistant Surgeon*, FLOYD S. DAFT, *Senior Biochemist*, K. M. ENDICOTT, *Assistant Surgeon*, and W. H. SEBRELL, *Surgeon, United States Public Health Service*

In a preliminary paper (*1*) the occurrence of calcified vessels in young rats receiving sulfaguanidine was reported. In subsequent reports (*2*, *3*) other lesions were recorded or briefly described. The rats were fed a purified diet deficient in B complex and containing 1 percent sulfaguanidine. In addition they received supplements of riboflavin, thiamin, pyridoxine, pantothenic acid, nicotinic acid, and choline. Some received further supplements of impure biotin concentrates.

It is the purpose of this report to describe in detail the vascular, cardiac, muscular (skeletal), and hepatic lesions which have been observed in rats on the above regimen.

Arteries.—The most frequent early alteration found histologically in arteries was a thin layer of basophilic homogeneous material coating short segments of the elastic fibers of the media or the internal elastic lamina. Less frequently observed were short segments of vessel wall in which muscle fibers were absent and elastic fibers less distinctly outlined. Such segments appeared relatively homogeneous and somewhat refractile. In some instances the basophilic material was seen only on the intimal side of the internal elastic lamina. Occasionally it was present in sufficient amount to cause localized elevation of the intima. When the basophilic layers coating the elastic fibers were thick, smooth muscle cells were quite indistinct marginally and their cytoplasm much less oxyphilic than normal. In many vessels the entire intima and media were basophilic and usually showed none of the normal histologic structures; occasionally a short segment of an elastic fiber could be recognized. The location and degree of involvement was quite variable. In a cross section of a given vessel the

[1] From the Divisions of Pathology and Chemotherapy, National Institute of Health.

involvement may occur only in one small area. It may involve multiple thin and short segments at various depths in the wall, or the entire thickness of the wall may be basophilic in single or multiple segments. Finally, the entire wall may be converted (at a given level) into a relatively rigid tube which does not contract after death (fig. 1C). In the latter condition the inner surface of the wall was smooth and the vessel appeared dilated. When there was total involvement, elastic fibers usually could not be demonstrated. The thin lamina or short segments of involvement usually were sharply delineated and in many instances marginated by relatively normal wall (figs. 1D and E). Sometimes the muscle fibers adjacent to such an area were swollen, showed decreased oxyphilia of their cytoplasm, and occasionally spindle shaped nuclei were increased in number.

Although fairly homogeneous in the early lesions, the basophilic wall of the extensively involved vessels showed some variation in density or depth of staining and in some instances was distinctly granular. As previously reported, this material forms a brownish red lake with alizarin red S, is brown to black when stained by the von Kossa method, and is brownish gray after staining by the Van Gieson technique. These typical color reactions, together with evident sclerosis of the vascular walls, identifies the basophilic material as calcium.

A variation of the pathologic picture described above was seen in a smaller number of vessels. In these, the vessel wall was refractile or "glassy" in appearance and was amphophilic and much less deeply stained than those described above. The wall was quite brittle, and in routine sections (not decalcified) it was usually broken into multiple variably sized plates often with serrated margins. This was in contrast to the deeply basophilic wall which, although fracturing to some degree, usually retained its normal outline. Occasionally elastic fibers, particularly the internal elastic lamina, could be distinguished in the hyalinized and calcified wall.

Necrosis of vessel walls was observed in a few animals but only in a very small percentage of the total number of altered vessels. Necrosis occurred more often in coronary vessels than in any other location. It was found only in vessels which also showed calcification. In these it was restricted to small areas usually located between calcified segments. In such areas the wall was thickened, oxyphilic, and granular, but showed no cellular exudation.

The adventitia of calcified vessels usually showed no increase in cellularity or of connective tissue fibers. Rarely such an increase was present but of slight degree. Also there was no evidence that any vessel had fractured or ruptured previous to the death of the animal; perivascular hemorrhage was not encountered. Two coronary arteries contained recent thrombi, and two others showed incomplete

FIGURE 1.—(A) Apical portion of dilated left ventricle filled with blood and showing a laminated mural thrombus. The myocardium is subtotally replaced by loose scar tissue. Note the thin subepicardial layer of muscle fibers. ×15. (B) Shows the entire thickness of a left ventricle wall at apex. Subepicardial muscle fibers at left and a small portion of a thrombus at lower right. Loose connective tissue forms most of the wall in this area. ×167. (C) Completely calcified coronary artery. ×150. (D and E) Partially calcified renal arteries. Note the noncalcified internal elastic lamina in E. ×370.

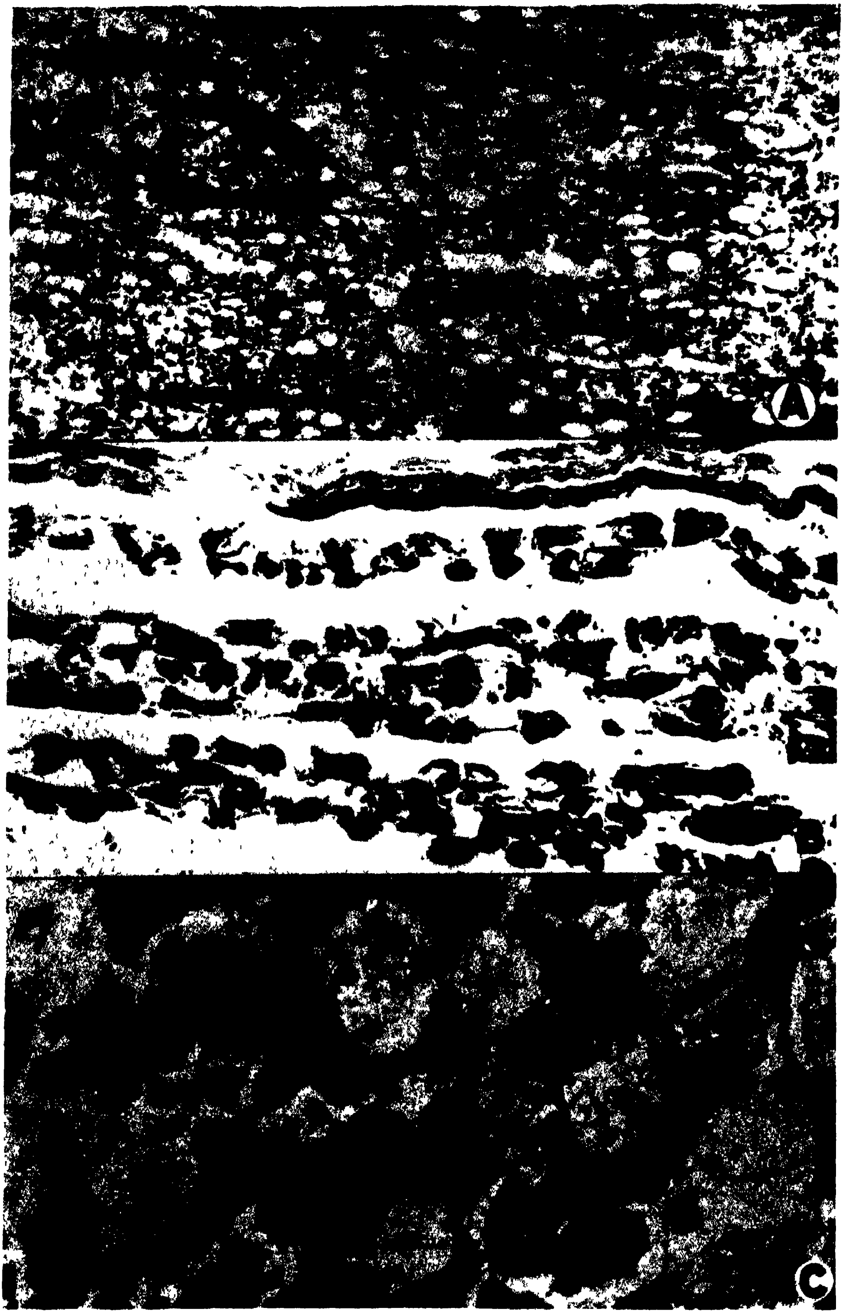

FIGURE 2.—(A) Marrow from mid-portion of tibial shaft showing aplasia of granulocytes. Most of the few remaining cells belong to the erythropoietic series. ×143. (B) Hyalinized, necrotic, and fragmented skeletal muscle fibers. Contrast with the relatively normal fibers in upper part of photomicrograph. ×143. (C) Liver, showing greatly enlarged hydropic cells. At lower left two involved cells show recognizable nuclei of liver cell type. ×940.

obstruction of their lumens by extremely loose connective tissue. These will be considered further in the discussion.

Although in the majority of cases the involved vessel could be recognized as an artery, there was an occasional one in which such recognition was uncertain. On the other hand, focal calcification was observed rarely in the larger pulmonary veins. In the rat these veins possess cardiac type of muscle in their mediae.

Calcified arteries have been found in the lungs, heart, kidney, pancreas, stomach, intestines, mesentery, thyroid, mediastinum, and thymus. The above organs and tissues are listed in order of frequency in which vessel calcification was observed in the series of animals examined to date. These organs (excepting the thymus) and also the liver, aorta, skeletal muscle, esophagus, tibia, vertebra, and bone marrow were routinely examined histologically. Testis, thymus, and skin and subcutaneous tissue were examined with less regularity.

In the lungs only the larger pulmonary vessels at or near the hilus were involved. Arteries at the hilus of the kidney were calcified more often than those within the kidney. Such involved vessels were rarely seen in the cortex. In other organs and tissues (excepting the heart which will be discussed later), the involved vessels were of variable size and showed no consistent pattern distribution.

Heart.—In general the lesions of the coronary arteries were more severe than in the arteries of other organs. Involvement of coronary arteries occurred with about equal frequency in the right and left ventricles and in the interventricular septum. Such vessels were not found at or quite near the apex, and only rarely was a calcified artery seen in the lower half of the ventricles or septum. In a few hearts the sections passed through the orifice of a coronary artery. In such cases where the coronary was calcified in its first portion, the involvement stopped sharply at the junction of coronary and aorta. The aorta, usually the ascending portion, was regularly examined, but never showed pathologic alteration.

Lesions in the ventricular myocardium were present in 31 cases. The frequency of cardiac lesions cannot be determined satisfactorily since the time of their appearance is somewhat later than other lesions, and many animals died or were killed before the cardiac disease had had a chance to develop. In three hearts the involvement consisted only of a few minute to small foci of interstitial fibroblast proliferation or fibrosis. In the others, there were either foci of coagulation necrosis of muscle fibers, or recent scarring, or both. The recent (loose) scars were seen more often at and in the vicinity of the apex although both ventricles and septum were similarly altered in about one half of the cases. The degree of alteration decreased toward the base and only in a few cases was there myocardial damage present in the upper third of the heart. The scars were formed generally of a loose fibrillary

network with a moderate number of capillaries. In small foci there appeared to be little or no increase in connective tissue, the scar being a result of muscle fiber removal with collapse and condensation of the pre-existing interstitial tissue. In some areas the fibers were numerous, compactly disposed, and stained as collagen in the Van Gieson technique, whereas in others the fibers were much more distinct when stained by Masson's trichrome stain. The cellularity of such scars was variable in degree, usually sparse and never dense. Most cells were of fixed connective tissue type, although a few macrophages and rare lymphocytes and neutrophils were seen in a few cases. Capillaries and venules appeared increased in number and occasionally were distended with blood.

As seen in section the scars at the apex were often in the form of a band extending for a short distance into both ventricular walls toward the base of the heart. In most instances the band-like area occurred in the middle of the myocardium leaving a relatively unaltered internal and external muscle layer. In severely damaged hearts the scarring often approached or reached the endocardium at some point but usually left an intact but thin and interstitially fibrosed subepicardial muscle layer. In these cases the scar usually extended into the septum and one or both ventricles about half way to the base of the heart. This band of loose connective tissue as seen in section was occasionally interrupted by intervening patches of relatively normal myocardium. Similar scarring was observed occasionally in papillary muscles and less frequently around calcified arteries in the upper half of the ventricles. A few isolated muscle fibers were occasionally present in the loose scar tissue.

Muscle necrosis was of coagulation type. In most instances the fibers still retained their form and rarely was there interstitial connective tissue proliferation in such areas. The necrotic foci generally were of small to medium size and were most commonly observed adjacent to or near the scars. In some hearts multiple isolated foci of necrosis were seen, and in one, necrosis without scarring was present. Rarely, a few calcified fibers were noted. Mural thrombi, in the left ventricle, left auricle, or both, were present in about one-third of the hearts showing myocardial damage. Some showed organization, focal calcification, or both. As would be expected, thrombi were more frequent in the hearts with extensive pathologic alteration. In these cases the left ventricle wall at and near the apex was markedly thinned and the ventricle dilated and filled with blood. In three instances bulging of the wall at the apex was observed grossly suggesting beginning or actual cardiac aneurysm.

Skeletal muscle.—Hyaline necrosis or calcification of skeletal muscle was a common finding. The muscles examined included those from the leg, thigh, esophagus, and trunk. Often there was moderate

variation in degree of involvement in different muscle bundles as judged from single sections of the muscles examined. In some cases only an occasional altered muscle fiber was found; in others, single or multiple small groups of such fibers were present, and, in a few animals, all fibers of one or more muscle bundles were necrotic. Occasionally, degenerating fibers were present in the leg or thigh muscles and not in the paravertebral or esophageal muscles, or vice versa. Muscle fibers of the esophagus were necrotic less frequently than those from other locations.

Some muscle fibers showed indistinctness of or lack of cross striations, some were hyalinized but intact, others showed complete hyaline necrosis with fragmentation and retraction of the segments. In some of the hyalinized necrotic fibers there were poorly marginated vacuoles or areas of decreased density. A few muscle fibers showed distinct granular degeneration and decreased oxyphilia. In many animals an occasional calcified fiber was present and in a few cases there was complete calcification of most fibers in one or more muscle bundles. Such extensive calcification was recognized at autopsy as white gritty streaks or bands. In esophagi showing necrosis of muscle, a few calcified fibers were frequently observed, and in two animals all muscle fibers in the level examined were calcified.

A frequent associated finding was the focal proliferation of compactly grouped and often coherent large mononuclear cells, usually surrounding necrotic but clearly recognizable muscle fibers. In some cellular foci only oxyphilic debris was present and in a few the necrotic fibers had been completely removed. The cells surrounding the degenerating fibers, although occasionally discrete, frequently had indistinct peripheral margins and often they were coherent. In many instances the fibers were enclosed by large cytoplasmic masses having many deeply stained nuclei. The cytoplasm of these cells was slightly oxyphilic or amphophilic and their nuclei oval or round. The difficulty of differentiating myoblasts from histiocytes in this location is recognized but it is believed that most of the cells were of the latter type. Regenerating muscle fibers were rarely observed.

Liver.—Slight to moderate increase in size of liver cells and their nuclei, with nuclear hyperchromasia, was frequently observed. Also mitoses occurred with more than average frequency. A less frequent but more striking finding was marked edematous swelling of scattered single or grouped liver cells. These cells were very large, often three to four times average size, and in routine paraffin sections had clear or markedly vacuolated cytoplasm. Such cells occasionally showed a central, small, often pyknotic nucleus, held in position by a few radiating threads of cytoplasm. In frozen sections the nucleus was usually in a central or slightly eccentric position and the cytoplasm markedly vacuolated, but much less often collapsed than in paraffin

sections. Staining with Sudan IV and Best's carmine showed that neither fat nor glycogen was responsible for the liver cell enlargement and cytoplasmic vacuolation. When such cells were infrequent they were scattered irregularly; when numerous, they occurred in variably sized groups or bands which were fairly sharply delineated from adjacent uninvolved liver. In a few instances the involvement was clearly centrolobular, in one it was distinctly midzonal, but in most cases there was no consistent distribution pattern of the involved cells. Of the cases showing the hydropic liver cells, the involvement was slight in 40 percent, moderate in 40 percent, and marked in the remainder. In the latter group, one-half to three-fourths of all liver cells were edematous. In addition, a few livers showed small focal or larger centrolobular areas of necrosis. Since such necrosis is occasionally seen in control rats, the significance of this finding cannot for the present be evaluated.

Bone marrow.—The changes which occur in bone marrow were described in a report (*3*) dealing with the agranulocytosis which develops with regularity in these animals. Briefly, the bone marrow alteration consists of from slight to subtotal depletion of cells of the granulocytic series. Mature cells first disappear but when the aplasia is marked, only a few very immature granulocytes remain. In this stage there is often moderate to marked congestion.

Hemorrhage.—The occasional occurrence of hemorrhage into various organs and tissues warrants little description for the present. In most instances the hemorrhage was of recent origin and usually there was very little associated change in the involved tissues. The most frequent sites of the hemorrhages were the skin and subcutaneous tissue and the testis.

DISCUSSION

The sequence of events which ends in calcification of vessels does not appear to follow the same pattern regularly. Frank necrosis of vessel walls was observed in a minority of animals and usually only in small segments or foci in vessels which were also partially calcified. In a few vessels a little granular calcific material was observed in a short oxyphilic and necrotic segment, suggesting that granular necrosis occasionally preceded calcification. The deposition of calcium in layers along elastic fibers was seen in many vessels. The progression of this process with eventual fusion of such layers appears a more satisfactory explanation of the pathogenesis of most vascular lesions. In some vessels hyalinized segments were observed. The diffuse deposition of calcium in such an altered wall would be expected to result in a brittle and somewhat refractile structure. This type of alteration was present in one or more vessels of many animals. In rare instances material staining like calcium was observed in the cytoplasm of viable cells.

The lesions in the myocardium appear to be, first, patchy necrosis of muscle fibers at or near the apex, followed by the formation of a loose fibrillary "scar," and finally by fibrosis. As the process advances at the apex, occasionally with aneurysmal bulging of the left ventricle, the areas of involvement extend toward the base of the heart.

The mode of action of sulfaguanidine in producing the lesions described has been discussed in previous reports (*1*, *2*, *3*). The lowering of the intestinal synthesis of essential growth factors, direct toxic action, and the inhibition of certain enzyme systems were considered. The cardiac necrosis may well be produced in the same manner as other lesions. However, it appears that the sclerotic coronary arteries play a part in the progression of the cardiac disease if not in its initiation. Supporting this belief is the fact that the main coronary arteries and their larger branches in the upper two-thirds of the ventricles are the ones involved whereas the myocardium farthest away from the blood supply is usually first and most severely damaged; also muscle fibers subjacent to endocardium and epicardium are least frequently involved.

If the diseased coronary arteries are accepted as contributing to the myocardial damage, it must be assumed that this is effected in most cases by a disturbance of circulation other than blockage. Of the large number of calcified arteries studied to date, there were only two which were thrombosed. One was small, noncalcified, and located in a recent myocardial scar. The other vessel, which had a calcified wall, contained a fibrin thrombus which partly blocked the lumen. This heart had areas of myocardial damage much older than the thrombus. Also, two calcified coronary arteries showed subtotal obstruction of their lumen by sparsely cellular, very loose connective tissue. It was impossible in these cases to determine whether this condition was a result of thrombosis or intimal proliferation. It is recognized that sclerosed coronary arteries with constricted lumina cause nutritional disturbances in the myocardium resulting in the disappearance of muscle fibers and scar formation. It seems reasonable to assume that circulatory disturbances and nutritional deficiency can also occur as a result of rigid calcified coronary arteries without constricted lumina. These arteries in the areas of involvement have lost their distensibility and contractility which may slow the rate of blood flow. Also the loss of contractility may reduce the time during which normal intravascular pressure is maintained. However, this may be slight since the coronary system is so close to the highly elastic aorta.

The necrosis and calcification of skeletal muscle, often with histiocyte proliferation, are similar to that described by Olcott (*4*) and Pappenheimer (*5*) as occurring in the young of female rats fed a diet

deficient in vitamin E. However, the interstitial edema and fibrin and cellular exudate, noted by these and other authors, have not been observed in the muscles of our rats fed sulfaguanidine. It is realized that the diet used in this experiment contains marginal or possibly deficient amounts of vitamin E, yet a hyalinized or necrotic muscle fiber is seen only occasionally in control rats. Evidence has been advanced to indicate that biotin and vitamin K are synthesized by the bacteria of the gastrointestinal tract of the rat (*6*, *7*). It is known that sulfaguanidine inhibits the growth of bacteria in this location (*8*). If vitamin E were also synthesized by intestinal bacteria of the rat, it would seem plausible that the ingestion of this drug in a marginal diet might lead to a frank vitamin E deficiency.

SUMMARY

Rats fed a purified diet deficient in B complex and containing 1 percent sulfaguanidine regularly develop lesions of blood vessels, voluntary muscles, and bone marrow, and less often lesions of the heart and liver, and hemorrhages into various organs and subcutaneous tissues. All of the animals received supplements of riboflavin, thiamin, pyridoxine, pantothenic acid, choline, and nicotinic acid, and some received additional supplements of impure biotin concentrates. Arterial lesions consist of focal to extensive calcification, less often hyalinization or necrosis. These lesions were found in the lungs, heart, kidney, pancreas, thyroid, thymus, stomach, intestines, and mediastinum. Hyalin necrosis of skeletal muscle with or without calcification was found in all locations thus far examined. The muscles were those from leg, thigh, trunk, and esophagus. Lesions of the heart consist of necrosis of muscle, followed by the formation of loose, sparsely cellular scars. Often there is marked thinning of the left ventricular wall with dilatation, particularly at or near the apex. Many animals show marked hydropic swelling of isolated or grouped liver cells. In some instances more than half of all liver cells are involved. Slight to marked bone marrow aplasia (granulocytes) was observed in a majority of the animals.

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THE TRANSMISSION OF *PLASMODIUM LOPHURAE*, AN AVIAN MALARIA PARASITE, BY *ANOPHELES QUADRIMACULATUS*

By Herbert S. Hurlbut and Reddinal Hewitt*

The experimental infection of *Anopheles quadrimaculatus* with *Plasmodium lophurae* has been reported by Coggeshall (*1*, *2*) and Hurlbut and Hewitt (*3*). The mosquito transmission of this parasite by *A. quadrimaculatus* has not been reported previously so far as the writers are aware. Laird (*4*) has recently reported successful transmission with *Aëdes albopictus*.

Specimens of *A. quadrimaculatus* were fed on infected ducks having a gametocyte count of approximately 1 per 100 erythrocytes and kept at 74° to 80° F. during the development of the exogenous stages. Stomach dissections indicated that about 20 percent became oöcyst positive. The mosquitoes were allowed to bite 4-week-old ducks after a lapse of 17 to 27 days. Parasites were first observed in the blood of three out of four ducks so treated, 13, 13, and 23 days after the infective feedings. One of the birds had been splenectomized previous to infection. The infection in this specimen was more intense and of longer duration than in the other two ducks. In all cases the number of parasites which appeared in the blood following the bites of infected mosquitoes was very low, never exceeding more than one per thin-field. The data are presented in table 1.

TABLE 1.—*The mosquito transmission of* P. lophurae

Bird Number	Number of mosquitoes biting [1]	Development in the mosquito—days from infective feeding to transmission (74°-80° F.)	In the duck	
			Prepatent period (days)	Patent period (days)
HW5	19	23	23	7
HW60	10	17	13	5
HC103 [2]	10	[3] 19-27	13	12
HW72	6	23	No infection	

[1] Dissections had shown about 20 percent oocyst positive.
[2] Splenectomized prior to infection.
[3] Bird HC103 was infected by mosquitoes of several lots in which the time from infective feeding to transmission varied from 19 to 27 days.

Observations may be summarized as follows: The exogenous stages of this parasite were completed in about 17 days in *A. quadri-*

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maculatus at 74° to 80° F. The rate of oöcyst development suggests that this is close to the minimum time at this temperature. The prepatent period in 4-week-old ducks was 13 to 23 days. The level of parasitemia was low and the patent period of relatively short duration. Splenectomy prior to infection in one duck resulted in an infection of somewhat greater intensity than in nonsplenectomized ducks.

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SULFANILAMIDE IN THE TREATMENT OF LEPROSY [1]

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The introduction of sulfanilamide as a potent chemotherapeutic agent for combating certain types of invasive bacterial diseases and the striking results obtained from its use have led to a widespread trial of the drug. Bacteriological experiments by Long and Bliss (*2*) tend to prove that sulfanilamide does not in itself kill the microorganisms but exerts a bacteriostatic effect which aids the normal defenses of the body in overcoming infection. The administration of sulfanilamide and related compounds has been associated with definite although not necessarily unavoidable or serious hazards. In a recent article, Long and his associates (*3*) analyzed the toxic manifestations which occurred during the course of treatment with this drug in one thousand cases at the Johns Hopkins Hospital. The most common toxic effects were headache, dizziness, nausea, vomiting, cyanosis, drug fever, and drug rashes. The most serious toxic manifestations, however, were those associated with the blood or hemopoietic system and the liver (hepatitis).

Impressed by the action of sulfanilamide on other diseases, the writers decided upon its experimental administration to combat secondary infection in leprosy. They also wished to see if it would have an influence on the disease itself if given over a sufficient period of time and in sufficient dosage to produce an effective blood level.

First course.—At the beginning of the experiment nine patients, eight males and one female, were chosen from a group of volunteers. Eight of these cases were lepromatous and one was neural, although they all showed some neural manifestations.

Certain preliminary laboratory procedures were carried out in all cases. As a measure of kidney function, the urea clearance test was

[1] Published with the permission of the Surgeon General, United States Public Health Service.

made, in addition to a complete urinalysis and estimations of the nonprotein nitrogen and the urea nitrogen of the blood. A complete blood picture was made, this including the erythrocyte count, hemoglobin estimation (Sahli's method), total and differential leukocyte counts, and the sedimentation test (Cutler's method). Because of the toxic effect of the drug on the hemopoietic system, the determination of the blood elements was repeated every second day during the course of the treatment, and in some instances every day. Urinalyses were also made frequently. Patients with markedly impaired renal function were not chosen, because sulfanilamide is largely excreted by the kidneys and its accumulation in the body would give rise to toxic manifestations.

Long and Bliss consider 4 to 8 mg. percent of sulfanilamide an effective blood level in patients with mild or moderately severe tissue infection, and 10 to 15 mg. percent in patients who are severely ill. The plan adopted at the outset was to give 15 grains (about 1 gm.) of sulfanilamide and 15 grains of sodium bicarbonate at 4-hour intervals, four times daily for 6 days, then the same doses twice daily for 6 weeks. With this dosage the free sulfanilamide concentration of the blood ranged between 5.5 and 16.6 mg. percent, with an average of 9.0 mg.

Only two of these patients completed the 6-week course of treatment without toxic manifestations. The other seven were all hospitalized for fever ranging from 38° to 41° C. and other toxic disturbances. In these cases the treatment had to be discontinued between the sixth and the twenty-first days because of the following complications: drug fever, 4; neuritis, 1; drug dermatitis, 1; and hepatitis, 1. The amount of sulfanilamide taken by these patients varied from 315 to 1,650 grains (20 to 105 gm.).

One of these patients was critically ill. Jaundice was noted on the sixth day, and it was felt that a toxic hepatitis was developing. The liver and spleen were palpably enlarged. The icteric index was 50 units. The free sulfanilamide blood concentration was 16.6 mg. percent, and that of nonprotein nitrogen was 40 mg. percent. The drug was discontinued. Three days later the patient became delirious and the surface of the body was cold and clammy. Dextrose, 5 percent in physiologic saline, was administered by vein and subcutaneously, and the patient improved. Two weeks later the icteric index was 20 units. Within 1 month the weight increased 23 pounds and was maintained.

Second course.—After a rest period of 2 months, a second series of treatments was given to 6 of the above group and also to an additional 11 patients, 11 males and 6 females. This made a total of 20 patients who received sulfanilamide therapy, 14 taking one course and 6 taking two courses. Those taking the second course included 1 neural case and 16 active lepromatous ones which varied in degree of the disease from early to advanced.

The same laboratory analyses as before were carried out on this group before initiating treatment, but the subsequent examinations were made twice a week instead of every second day, unless it became necessary to do so more often. Because of the severe toxic reactions experienced in the first group, it was thought advisable to decrease the dose of the drug for the second course. The plan adopted was to try to obtain a sulfanilamide blood level between 4 and 8 mg. percent. To maintain this level, 15 grains of sulfanilamide and 15 grains of sodium bicarbonate were given at 4-hour intervals, four times daily for 2 days, after which the dose was lowered to 10 grains of each drug, three times a day for 12 weeks. The free sulfanilamide concentration of the blood of these patients was found to range between 3.2 and 9.0 mg. percent, with an average of 5.0 mg.

In this series the total number of days of treatment ranged from 3 to 92, and the total dosage varied from 75 to 2,880 grains (5 to 190 gm.). Six of the patients completed the entire course. It was necessary to hospitalize 12 of the group because of toxic reactions or fever, and the medication was discontinued in 11 of them. In spite of a continuous fever for more than a week, during which time the evening dose of the drug was omitted, the other case was able to complete the course of 88 days of treatment without further ill effects.

Altogether the drug had to be discontinued on account of high continuous fever in six cases. In one case progressive anemia was the reason for interrupting the treatment; in another it was persistent neuritis, and in still another, recurrent hepatitis.

One case suffered from cerebral depression followed by semicoma after the sixteenth day of treatment. She became critcally ill, with a temperature of 40° C. and a leukocyte count of 50,200 per cmm., with 94 percent neutrophiles (37 staff cells and 57 segmented cells). The blood nonprotein nitrogen was 50 mg. percent; the urine was negative for albumin, sugar, blood, and casts. After discontinuing the drug, 1,000 cc. of 5 percent dextrose in physiologic saline was given intravenously, two such doses being administered 6 hours apart. Two days later the patient was markedly improved.

Another case developed a rash over the entire body, and treatment was discontinued. After several weeks the treatment was resumed and the rash recurred, indicating that the dermatitis was probably due to the drug.

PATIENTS TAKING FIRST COURSE ONLY

Case 1.—Female, aged 48. Tolerated treatment for a period of 8½ days, during which 510 grains of sulfanilamide were taken. The drug was discontinued because of an erythematous rash and acute lepra reaction, with fever. Death occurred 6 months later, of ovarian carcinoma.

Result: No improvement in the maculo-anesthetic lesions of leprosy.

Case 2.—Male, aged 30. Took 315 grains of sulfanilamide during 5 days of treatment. Fever and a severe lepra reaction developed; drug discontinued.

Result: No benefit; the patient believed that the disease was aggravated.

Case 3.—Male, aged 48. After 7½ days of treatment (436 grains of sulfanilamide), continuous drug fever as high as 39° C. necessitated discontinuation.

Result: No benefit; the patient refused to take the second course.

PATIENTS TAKING BOTH COURSES

Case 4.—Male, aged 31. First course begun on July 27, 1940, continued for 15 days (total drug, 660 grains). On the ninth day, the patient was hospitalized because of conjunctivitis and a mild febrile reaction (to 38.9° C.), which continued until the drug was discontinued.

Preliminary laboratory data: July 22, 1940, urinalysis, negative; nonprotein nitrogen, 33.3 mg. percent; urea clearance test, 64 percent of normal renal function. July 25, 1940: erythrocytes, 4,110,000; hemoglobin, 74 percent; leukocytes, 6,300; differential: stab cells 5, segmented cells 66, lymphocytes 23, monocytes 5, basophiles 1 percent; sedimentation test, 26 mm. in 1 hour.

Laboratory data during and after therapy: July 31, 1940: free sulfanilamide in blood, 10.5 mg. percent August 6, 1940: erythrocytes, 3,540,000; leukocytes, 5,100; differential: stab cells 15, segmented cells 55, lymphocytes 21, monocytes 2, eosinophiles 6 percent. October 28, 1940: sedimentation test, 22 mm. in 1 hour. November 6, 1940: erythrocytes, 3,970,000; hemoglobin, 70 percent; leukocytes, 4,050, differential: stab cells 12, segmented cells 43, lymphocytes 25, monocytes 7, eosinophiles 13 percent.

Second course started November 7, 1940; drug taken for 43 days (total 1,410 grains). Severe neuritic pains in both legs experienced toward the end of the period, persisting until the drug was discontinued. Sulfanilamide concentration varied from 3.2 to 4.1 mg. Eosinophilia persisted, 13 percent. March 3, 1941: sedimentation test 26 mm.

Result: Ulcers of mouth and lips definitely improved. Lepromatous lesions of face less extensive. Macules over the body lighter in color and not as infiltrated as at first.

Case 5.—Male, aged 23. Completed first course of 47 days (1,620 grains) without toxic manifestations. Despite progressive anemia and severe neuritis, he also completed the second course of 70 days (2,160 grains).

Result: Some improvement of all leprous lesions.

Case 6.—Male, aged 29. Tolerated the first course for only 6½ days (375 grains). Neuritis and conjunctivitis supervened, and a severe toxic hepatitis developed. After a 3 months' rest he volunteered for the second course, which was discontinued after the third day when symptoms of hepatitis recurred.

Result: Improvement of general condition, with gain of 23 pounds in weight.

Case 7.—Male, aged 37. First course taken for 21 days (840 grains). Treatment stopped because of severe conjunctivitis and fever. The second course of 92 days (2,880 grains) was completed.

Result: Slight improvement in some leprous lesions.

Case 8.—Male, aged 50. First course completed (1,650 grains in 47 days) without evidence of toxic reactions.

Preliminary laboratory data: July 24, 1940: urinalysis, negative; nonprotein nitrogen, 42.8 mg.; urea clearance test, 44.3 percent. July 25, 1940: erythrocytes, 4,340,000; hemoglobin, 100; leukocytes, 7,500; differential: stab cells 3, segmented cells 64, lymphocytes 25, monocytes 3, eosinophiles 3, basophiles 2 percent; sedimentation test, 21 mm.

Laboratory data during and after therapy: July 30, 1940: free sulfanilamide, 16 mg. August 3, 1940: free sulfanilamide, 10.1 mg. September 3, 1940: erythrocytes, 3,450,000; leukocytes, 5,750; differential: stab cells 5, segmented cells 57, lymphocytes 26, monocytes 5, eosinophiles 5, basophiles 2 percent. October 28, 1940: sedimentation test, 9 mm.

The second course was also completed (2,160 grains in 70 days) without toxic symptoms. Sulfanilamide concentration varied between 4.4 and 7.0 mg. January 24, 1941: erythrocytes, 3,760,000; hemoglobin 82; leukocytes, 6,100; differential: stab cells 19, segmented cells 33, lymphocytes 31, monocytes 5, eosinophiles 12 percent.

Result: Improvement of leprous lesions noted, but since there had been a tendency towards improvement before therapy it cannot be credited to sulfanilamide alone.

Case 9.—Male, aged 35. First course tolerated for 7½ days (435 grains). Suspended because of continuous fever (39.5° C.) and severe lepra reaction. Second course continued for only 8 days (280 grains); discontinued for the same reasons—fever (40° C.) and acute lepra reaction.

Result: Progressive improvement occurred, but since this had started before instituting sulfanilamide therapy no credit can be given to the drug.

PATIENTS TAKING SECOND COURSE ONLY

Case 10.—Female, aged 35. Tolerated the drug for 76 days (2,400 grains) in spite of acute lepra reaction with fever (40° C.).

Result: No improvement.

Case 11.—Male, aged 20. Completed course of 88 days (1,970 grains). A mild lepra reaction occurred, with fever lasting 1 week; patient kept in bed and dosage temporarily decreased. Severe anemia with eosinophilia (10 percent) developed later.

Result: No apparent change in the lepromatous lesions.

Case 12.—Male, aged 23. After 27 days a generalized erythematous rash developed. It disappeared after the drug was discontinued, but recurred later when it was resumed. It was concluded probably to be a drug rash, and treatment was stopped. Total dosage, 1,005 grains.

Preliminary laboratory data: November 6, 1940: urinalysis, negative; nonprotein nitrogen, 34.6 mg.; erythrocytes, 4,360.000; hemoglobin, 82; leukocytes, 6,550; differential: stab cells 12, segmented cells 55, lymphocytes 29, monocytes 2, eosinophiles 2 percent; sedimentation test, 21 mm.

Laboratory data during and after therapy: November 19, 1940: free sulfanilamide, 6.4 mg. November 26, 1940: free sulfanilamide, 4.4 mg.; erythrocytes, 2,990,000; leukocytes, 10,600; juvenile cells 2, stab cells 16, segmented cells 61, lymphocytes, 15, monocytes 2, eosinophiles 2, basophiles 2 percent. March 20, 1940: sedimentation test, 25 mm.

Result: No improvement; disease stationary.

Case 13.—Male, aged 33. Took 820 grains during 34 days of treatment. Complications—chills and fever, conjunctivitis, epistaxis, and anemia caused discontinuance.

Result: A noticeable improvement in the lepromata of the face, with healing of some ulcerations of the nose.

Case 14.—Female, aged 23. Took the treatment for 40 days (1,260 grains). Drug fever developed and the drug was withheld for 4 days.

Result: Secondarily infected ulcerations of the legs healed, but the leprotic condition remained stationary or was aggravated.

Case 15.—Male, aged 51. Treatment given for 41 days (1,320 grains). There was an early, mild febrile reaction (38° C.) during which the dose was diminished. When fever recurred, treatment was stopped.

Result: No improvement.

Case 16.—Female, aged 32. Completed 84 days' treatment (2,580 grains). After the tenth day, chills and fever (39° C.) occurred and lasted several days; the dose was temporarily decreased.

Preliminary laboratory data: November 8, 1940: urinalysis, negative; nonprotein nitrogen, 30 mg.; erythrocytes, 4,020,000; hemoglobin, 70; leukocytes, 5,650; differential: stab cells 8, segmented cells 67, lymphocytes 23, monocytes 2 percent; sedimentation test, 23 mm.

Laboratory data during and after therapy: November 18, 1940: free sulfanilamide, 5.2 mg. November 25, 1940: free sulfanilamide, 6.2 mg. December 11, 1940: erythrocytes, 2,980,000; leukocytes, 7,450; differential: juvenile cells 5, stab cells 30, segmented cells 38, lymphocytes 25, monocytes 2 percent. March 22, 1941: sedimentation test, 29 mm.

Result: Slight improvement in the leprous lesions.

Case 17.—Female, aged 27. Tolerated 14 days of therapy (390 grains). High continuous fever developed (40° C.), followed by depression, delirium, and somnolence. There was hyperleukocytosis, and the condition became critical before fluids could be forced.

Result: The disease progressed, and the patient states that she has had more frequent lepra reactions than before.

Case 18.—Female, aged 40. Treated for 14 days (540 grains). Severe drug fever and marked depression required cessation of the treatment.

Result: No benefit.

Case 19.—Male, aged 40. Took treatment for 24 days (780 grains). A continuing drug fever (39° C.) led to discontinuing the drug.

Result: Progression was noted shortly after the treatment, new macules developing and some old ones becoming reactivated.

Case 20.—Female, aged 36. After 2 weeks, patient hospitalized for fever (40° C.). Altogether she took 21 days of treatment (720 grains).

Result: Unimproved.

SUMMARY OF LABORATORY DATA

No severe blood dyscrasia, such as granulocytopenia or severe hemolytic anemia, was experienced among the group treated.

Anemia.—Examinations of the average erythrocyte and hemoglobin levels showed, over a period of 80 days, a slow progressive drop in all cases. While in the majority of instances this anemia was mild, a significant decline up to 50 percent was not an unusual finding. In three cases, the drug was discontinued because of slow progressive anemia. The erythrocytes dropped from 4,100,000 to 1,970,000 per cmm. in 34 days in one of them, and from 3,790,000 to 2,100,000 in 40 days in another, while the hemoglobin fell from 84 to 48 percent in 78 days in the third.

Leukocytosis.—The persistence of leukocytosis of 12,000 per cmm. or more occurred in 14 of the cases, in whom 138 high counts were recorded. The figures averaged between 12,000 and 25,000. One case had a count of 50,200, and another had 40,300.

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Leukopenia.—Leukopenia was considered to be present when the leukocyte count fell to a level below 5,000. Of the 20 patients, depression of the leukocytes below this level occurred in 6, for whom 27 low counts were recorded. In only 2 of the cases was the leukocyte depression noted more than once. The lowest count was 3,700.

Differential count.—Detailed examination of the leukocytes revealed significant changes in the neutrophiles and eosinophiles. All cases but one showed a shift to the left (Shilling's hemogram), whether they had leukopenia or leukocytosis. In 5 of those with leukopenia, myelocytes were noted once and juveniles in 17 instances.

Eosinophilia (5 to 23 percent) occurred in 12 of the cases and was found on from 1 to 19 occasions in each case, with a total of 65 times. Only 1 case had eosinophilia (7 percent) before treatment was started. On admittance the feces examination was negative for ova and worms, and no other cause for the eosinophilia was found. It is significant that it was this patient who developed the highest eosinophilia (23 percent) during the treatment.

Eosinophilia has not been reported in the literature as a result of treatment with sulfanilamide or related compounds. The reason for the increase in these cells in about one-half of the leprosy patients so treated is unknown. It is interesting that the two patients who developed severe drug rashes did not show eosinophilia, so that dermatitis was not the exciting factor. The acute leprous skin reactions noted in several of the cases also did not seem to account for it. Might not the appearance of eosinophiles in the blood stream in such large numbers in a chronic disease like leprosy indicate a favorable tissue reaction to the disease?

COMMENT ON COMPLICATIONS

On the whole, the toxic complications of sulfanilamide therapy in leprosy seemed to be more frequent and more severe than those reported in the literature as occurring in the treatment of other infectious diseases (*1*). The initiation of acute lepra reaction was not an unusual occurrence; it was noted in 9 of the cases treated. Drug fever was observed in 12 of the patients (60 percent). At times it was difficult to determine whether the patient's fever was due to toxicity of the drug or to the setting up of a lepra reaction by the drug. Neuritis was a complicating factor in 4 patients, whether caused by the drug directly or due to its stirring up of a lepra reaction in the nerve. Conjunctivitis was noted in 3 patients, and a drug dermatitis in 2. Finally, the changes produced in the blood pictures of all the patients, as noted above, seemed to be a rather unusual and severe type of reaction.

RESULTS OF THE TREATMENT

Of the entire group of 20 patients treated, 6 show some improvement of their leprous lesions. Two others show improvement, but they were improving when the treatment was started. One is probably stationary. The remaining 10 show probably slight progression of the disease. In 2 of the cases the sulfanilamide treatment definitely helped to clear up secondary infections. It is of interest in this connection that sulfanilamide therapy produced prompt improvement of pseudoerysipelas in 12 patients not included in this group. One patient of the treated group has since died of ovarian carcinoma, with no change in the leprotic condition.

CONCLUSIONS

Sulfanilamide therapy has proved effective in the treatment of secondary infections complicating leprosy, and as a help in the healing of secondarily infected leprous ulcerations.

Sulfanilamide cannot be regarded as a curative agent for leprous lesions, either of the macular or lepromatous type.

The significance of the development of eosinophilia during the course of sulfanilamide treatment is interesting and may be a fruitful field for future study.

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ANTIBACTERIAL ACTION OF SEVERAL SULFONAMIDE COMPOUNDS ON *HEMOPHILUS INFLUENZAE* TYPE b [1]

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Since the introduction of the use of sulfonamide compounds in the treatment of bacterial infections a number of reports have appeared concerning the use of sulfanilamide and sulfapyridine in the treatment of *Hemophilus influenzae* meningitis. In certain instances it seems that the compounds had a favorable influence on the course of the infections; in other instances they were without demonstrable influence. The early reports were largely of a single case or a small number of cases. These have been reviewed by Bilger and Haralambie (*1*)

[1] From the Division of Biologics Control, National Institute of Health. Received for publication April 1, 1942.

and Guyton (*2*). Some of the more recent reports contain the results of the treatment of larger numbers of cases.

Neter (*3*) reported 14 cases, stating "some were treated with antiserum, sulfanilamide, and sulfapyridine." Only one recovered. Aléman (*4*) wrote about the death of 7 children treated with sulfapyridine. All were under 2 years of age. On the other hand, Neal, Appelbaum, and Jackson (*5*) have reported the recovery of 10 of 25 patients (under 10 years of age) treated with sulfapyridine and its sodium salt; 4 received antiserum in addition to the drug. None of the recoveries, however, were of patients under 2 years of age. Lindsey, Rice, and Selinger (*6*), using sulfanilamide or sulfapyridine with antiserum, reported the recovery of 6 of 13 children. In addition to a highly potent rabbit antiserum, Alexander (*7*) used sulfanilamide and sulfapyridine (sulfathiazole in 2 cases) in the treatment of 26 cases. Sixteen recovered. No doubt much of her success can be attributed to the antiserum. Very recently Hoyne (*8*) reported the recovery of 5 patients under 2 years of age; 3 were treated with sulfapyridine, 1 with sulfanilamide, and 1 with both compounds.

The few experimental studies that have been reported indicate that sulfanilamide and sulfapyridine are to a certain extent antagonistic to *H. influenzae* and that sulfapyridine is more so than sulfanilamide.

In 1937 Long and Bliss (*9*) mentioned that a 1:10,000 concentration of sulfanilamide in 50 percent normal horse serum broth markedly inhibited the growth of *H. influenzae*. No details of the experiment were given. Povitsky (*10*), using neoprontosil and antiserum, observed that more mice survived following treatment with the two agents combined than with either alone. Pittman (*11*) reported that sulfapyridine was effective in protecting mice against an experimental infection of a virulent strain which was not type-specific. The percentage of survival varied directly with the dosage. Neter (*3*) observed that *H. influenzae* remained viable for 24 hours at 37°C. in spinal fluid containing sulfanilamide in concentrations of 5 to 15 mg. per 100 ml., while in the presence of corresponding amounts of sulfapyridine the bacteria were killed. Guyton (*2*), in a more extensive study, noted the effect of these two drugs on the growth of two strains of *H. influenzae* (one was not type-specific, the other was of Type b) in blood broth. He found that both drugs may produce an inhibitory or at times even a bactericidal effect, and that sulfapyridine in concentrations of 1 to 10 mg. per 100 ml. exerted a much greater effect than did sulfanilamide in the same concentrations.

In the present work we have used sulfanilamide, sulfapyridine, sulfathiazole, sulfadiazine,[2] and two other compounds, sulfanilyl sulfanilamide and para-nitrobenzoic acid, which have not been accepted for therapeutic use. A comparison of the action of each was made both on experimental infections in mice and on the growth of bacteria in culture medium. Observations on the susceptibility of cultures obtained from different patients were included. In addition, a study was made of the influence of treatment with (1) antiserum and sulfapyridine and (2) antiserum and sulfadiazine on infection in mice. Type b strains of *H. influenzae* were used throughout the investigation.

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[2] The sulfadiazine was obtained through the courtesy of Calco Chemical Co.

MATERIALS AND METHODS

Cultures.—Six strains of Type b *H. influenzae*, numbered 571 to 576, were employed. All had been isolated directly from the spinal fluid of children suffering from meningitis before administration of either drug or antiserum. They were kept in defibrinated rabbit blood. Transfers were made into fresh blood every 2 weeks, the tubes incubated for 12 to 20 hours, and then stored in the ice box. Passages through mice were made frequently. The virulence of each strain was such that less than 10 bacteria suspended in mucin were usually lethal for 2 of 3 mice.

Preceding an experiment, 2 or 3 rapid transfers of the culture were made in Levinthal broth. A broth culture approximately 5 hours old was used in all experiments.

Mice.—Mice from a closely inbred colony of a white Swiss strain, weighing 15 to 19 grams, were employed. Those of one sex were used in a single experiment.

Mucin.—Two lots of mucin were used, one in a concentration of 3.5 percent and the other in a concentration of 5 percent. The necessity to use different concentrations emphasizes the variation in different lots which may be encountered. The solutions were prepared according to the method previously described (*12*). Alone they were apparently not toxic for mice.

Method of testing for antibacterial action in mice.—The procedure was similar to that described in a previous paper (*11*). That is, mice were given orally one dose of the drug followed by an intraperitoneal inoculation of the culture suspended in mucin. This method was selected in preference to giving the drug with food, because mice that are given intraperitoneal inoculations of mucin do not eat for a number of hours. The fallacies of this procedure will be pointed out later.

The sulfonamide compounds were suspended in 5 percent gum arabic with the desired dose in a volume of 0.4 ml. They were administered into the stomach by means of a silver eustachian catheter, child's size, attached to a tuberculin syringe.

Each of three groups of 10 mice were given a different amount of the compound under test. The amounts were progressively doubled, e. g., 2, 4, and 8 mg. The exact amount of each drug was selected so that if possible more than half of the mice receiving the smallest dose would succumb while more than half of those receiving the largest would survive. One hour after the administration of the drug the mice were inoculated intraperitoneally with 1 ml. of a 10^{-3} to 10^{-4} dilution of the culture prepared in mucin. This represented approximately 100,000 minimum fatal doses, yet it was sufficiently small not to cause death by toxicity. The bacilli injected with mucin rapidly multipled, and at death bacteria were generally recovered from the heart's blood.

Virulence titrations of each strain were carried out in each experiment. One ml. of the 10^{-8} dilution, containing approximately 5 to 7 bacteria, usually killed 2 of 3 mice.

The mice were kept under observation for 96 hours. Heart's blood cultures were made from all that died in order to ascertain whether they died from a *H. influenzae* infection or some other cause.

The results were calculated by the Reed-Muench (*13*) method to determine the amount of drug which theoretically would have protected 50 percent of the mice, i. e., the 50 percent endpoint of the drug.

Method of testing for antibacterial action in vitro.—A liver infusion medium, which MacLeod (*14*) claims does not inhibit the action of sulfonamides, was used for testing the antibacterial action of the compounds. To one preparation of the medium 1 percent casein hydrolysate was added. Influenza bacilli grew in the

medium without the addition of the accessory growth factors X (hematin) and V (di- or triphosphopyridine nucleotide). The growth-promoting property of the medium, however, was relatively unstable, even when the medium was kept in dark bottles and in the ice box.

A 1:500 dilution (10 mg. in 5 ml.) of the sulfonamide compound was prepared in distilled water or the medium, heated for 10 minutes in a boiling water bath, and then, while hot, 1 part was added to 19 parts of medium to give a 1: 10,000 dilution. Five ml. of each solution were placed in a test tube of 20 mm. diameter and inoculated with 0.1 ml. of a 2.5×10^{-6} dilution of a 5-hour culture. The liver-infusion medium was used as the diluent. The inoculum represented approximately 200 bacteria per ml. of medium.

The cultures were incubated for 24 hours in a water bath at 37.5° C. Since the marked fluorescence of the medium prevented the determination of growth by gross turbidity, the growth was determined by colony count. Tenfold serial dilutions (0.5 ml. in 4.5 ml. of diluent) of the culture were made in proteose peptone solution. One ml. of the culture and the respective dilutions was cultured in 10 ml. of nutrient 0.15 percent agar containing 0.1 ml. of Fildes' peptic digest of blood (*15*). The subcultures containing 10 or fewer bacteria showed isolated fluffy colonies.

EXPERIMENTAL

Comparison of antibacterial action of compounds on infection in mice.—In table 1 are summarized the results of 6 experiments on the

TABLE 1.—*Comparison of antibacterial action of 6 compounds on* H. influenzae *in mice*

Compound	50 percent endpoint of compound						Average activity ratio to sulfapyridine
	Dec. 18, 1940, No. 575	Mar. 13, 1941, No. 575	Mar 19, 1941, No. 576	Apr. 3, 1941 No. 575	July 17, 1941, No 572	July 22, 1941, No. 572	
	Mg.	*Mg.*	*Mg.*	*Mg.*	*Mg.*	*Mg.*	
Sulfapyridine	4.35	6.4	2.7	2.83	4.32	2.7	1.0
Sulfathiazole	2.84(1.53)	3.5(1.83)	----------	----------	----------	2.32(1.?7)	1.51
Sulfadiazine	<2.0	<0.5	----------	0.365 (7.75)	0.5(8.64)	0.29(9.31)	8.57
Sulfanilamide	----------	----------	6.35(0.43)	----------	>10.0	>12.0	?
Sulfanilyl sulfanilamide	----------	----------	2.9 (0.93)	----------	9.0(0.48)	----------	0.70
Para-nitrobenzoic acid	----------	----------	<5.0	2.7 (1.05)	2.1(2.05)	----------	1.55

Figures in parentheses indicate activity ratio to sulfapyridine.

antibacterial action of the 6 compounds. In each experiment an estimate of the 50 percent endpoint of each drug was made, and where possible the activity of the compound in relation to sulfapyridine was determined. The strain and the size of inoculum varied in the separate experiments, hence varying endpoints for the same compound were obtained. However, the activity ratios of a single compound in the different experiments were fairly close in the majority of instances.

The activity of sulfadiazine was the highest, being 8.57 times that of sulfapyridine. The effectiveness of sulfathiazole and paranitrobenzoic acid was one and a half times that of sulfapyridine while

sulfanilyl sulfanilamide and sulfanilamide were less active than sulfapyridine. In only one of three experiments with sulfanilamide was the 50 percent endpoint obtained. In this particular experiment, culture No. 576 was used. It will be shown later that this strain was more sensitive to the action of all of the compounds than was any of the others employed.

Since these experiments did not take into account the blood levels of the compounds, the activity ratios which were obtained are not to be interpreted as the relative antibacterial values of the respective drugs.

TABLE 2.—*Variation in susceptibility of 6 cultural strains to sulfapyridine in vivo*

Strain	50 percent endpoint			Average
	Experiment No. 1 (Dec. 10, 1940)	Experiment No. 2 (June 11, 1941)	Experiment No. 3 (July 15, 1941)	
	Mg.	*Mg.*	*Mg.*	*Mg.*
571	2.65	3.0		2.82
572	4.9	5.25	5.85	5.33
573	6.1	8.0		7.05
574	<2.0	2.35		2.0 (approx.)
575	5.2	5.7	5.22	5.37
576	<2.0	1.26		<2.0

Dose of culture: 1 ml. of 10^{-4} dilution of culture.

Variation in susceptibility of bacterial strains.—The susceptibility of the 6 strains of *H. influenzae* to sulfapyridine *in vivo* are given in able 2. All strains were of similar virulence for mice. Six were used in the first two experiments and two in the third experiment. The amount of sulfapyridine required to protect 50 percent of the mice against the bacteria of a particular strain was in quite close agreement in the different experiments.

Strain No. 576 was found to be most sensitive to the action of sulfapyridine. In the first experiment, a sufficiently small dose of the drug was not given to determine the amount that would protect 50 percent of the mice. Smaller doses were given in the second experiment and the endpoint was found to be 1.26 mg. In the same experiment it was shown that 8 mg. was required to protect 50 percent of the mice against strain No. 573. In other words, slightly more than six times as much sulfapyridine was required to protect the mice against No. 573 as against No. 576. The susceptibility of the other four strains was between that of Nos. 576 and 573.

It should be noted that for each strain the amount of drug required to protect the mice in each experiment was practically the same. Since 6 months or more elapsed between the first and latter experiments, it is indicated that there was no change in the susceptibility of the 6 strains during the period of artificial cultivation.

dine failed to protect any mice and 0.005 ml. of serum protected only half of the mice, it appears that the survival of 70 percent of the mice which received the combined treatment of this same amount of compound and one-fifth this amount of serum (0.001 ml.) was not due merely to an additive effect of the two agents.

TABLE 5.—*Protection of mice with combination of treatment with antiserum and sulfadiazine*

Agent	Dosage				Survival
Sulfadiazine and antiserum	0.5 mg. and 0.5 ml. of 1:500 dilution				100 percent.
	20S				
Antiserum	0.5 ml. of dilution				50 percent endpoint 1:155 dilution (0.0032 ml.).
	1:50	1:100	1:200	1:400	
	4S 1D	5S 1D	2S 4D	1S 5D	
Sulfadiazine	0.5 mg.		1.0 mg.		50 percent endpoint 0.5 mg.
	6S 4D		8S 2D		
Culture control	1 ml. of 10^{-3} dilution				None.
	10D				

Cultural strain No. 575

In table 5 are given the results of a similar experiment with sulfadiazine. In this instance, all mice survived which were treated with both sulfadiazine and antiserum. Five-tenths mg. and 0.001 ml. of the respective agents were used. The 50 percent endpoint of the drug was 0.5 mg. and of the serum it was 0.0032 ml. As with sulfapyridine, the protection of the mice with the combined treatment seems to be greater than would be expected from the additive effect of the two agents.

TABLE 6.—*Variation in susceptibility of 3 strains of* H. influenzae *to antiserum*

		Strain [1] No. 571	Strain [1] No. 575	Strain [1] No. 576
Dilution of serum [2]	1:25			10 S
	1:50		6 S 4 D	3 S 7 D
	1:100	6 S 4 D	4 S 6 D	2 S 8 D
	1:200	8 S 2 D	10 D	
	1:400	5 S 5 D		
Calculated 50 percent endpoint		1:280	1:71	1:45
Virulence titration	10^{-6}	3 D	3 D	3 D
	10^{-7}	2 S 1 D	2 S 1 D	3 D [3]
	10^{-8}	2 S 1 D	3 D	1 S 2 D

[1] Inoculum = 1 ml. of 10^{-3} dilution in mucin.
[2] Inoculum = 0.5 ml.
[3] One death was not specific.

Variation in susceptibility of different bacterial strains to antiserum.— In tables 2 and 3 it was demonstrated that different strains of Type b *H. influenzae* were not uniform in susceptibility to the sulfonamide compounds. In table 6 it is shown that they, likewise, varied in sensitivity to the action of antiserum *in vivo*. Susceptibility to serum, however, did not parallel sensitivity to the compounds.

In the experiment recorded in table 6, three strains, Nos. 571, 575, and 576, were employed. The antiserum was the same as was used in the preceding experiments. The calculated 50 percent endpoints of the serum against the respective strains were 1:280, 1:71, and 1:45. A repetition of this experiment gave similar results. No. 576 was the most resistant strain to the action of the antiserum whereas with the compounds it was found, both *in vivo* and *in vitro*, to be the least resistant of the 6 strains.

DISCUSSION

In the present study it has been shown that, under the conditions of our experiments, sulfadiazine, sulfathiazole, and sulfapyridine are capable of exerting antibacterial action against Type b *H. influenzae* and that, relatively, sulfanilamide has little power. In the experiments with mice, about one-eighth as much of sulfadiazine and two-thirds as much of sulfathiazole as of sulfapyridine was required to protect 50 percent of the mice. These experiments, however, did not take into consideration either the rate of absorption and excretion or the blood level of the compounds. Since it has been shown by others (*16, 17*) that with the same dosage higher blood levels are obtained with sulfadiazine than with sulfathiazole or sulfapyridine, it may be concluded that at least part of the variation was due to differences in concentrations in the blood. Furthermore, in culture medium these wide differences in activity were not observed. However, it was observed that sulfadiazine and sulfathiazole were slightly more active than sulfapyridine. The former two effected similar action.

Sulfanilamide, both *in vivo* and *in vitro*, was found to have very little antibacterial activity against 5 of the 6 strains tested. Against the sixth strain it was active.

Differences in strain sensitiveness or resistance were also observed when sulfadiazine, sulfathiazole, and sulfapyridine were used. The only strain that was sensitive to the action of sulfanilamide was the one most sensitive to the action of the other compounds. Only one-sixth as much sulfapyridine was required to protect mice against this strain as against the most resistant one. This unequal susceptibility of different strains suggests that the equivocal clinical results that have been obtained may be in part due to variations in susceptibility of the infecting organisms.

In the work with the two remaining compounds, sulfanilyl sulfanilamide and para-nitrobenzoic acid, it was found that the former probably was less active than sulfapyridine; with the latter, antibacterial action *in vivo* was about the same as with sulfathiazole, but *in vitro* the results were irregular. In some instances its activity was comparable to that of sulfathiazole, while in others it was more marked. Although this compound does have a certain amount of antibacterial power, its toxicity excludes therapeutic application. Frequently 10 mg. caused death in 16 to 20 gm. mice.

From the results of our experiments, it is suggested that of the 6 compounds studied, sulfadiazine and sulfathiazole are probably the most active against Type b *H. influenzae*. If the early reports (*16, 18, 19*) that sulfadiazine is less toxic than sulfapyridine or sulfathiazole are substantiated, then the use of sulfadiazine might be preferable in the treatment of infections caused by Type b *H. influenzae*.

On the other hand, sulfathiazole may be more active than it was formerly thought to be. When the use of sulfathiazole was introduced, several workers (*20, 21*) advised against its use for the treatment of meningitis because of its low absorption in the spinal fluid. Nevertheless, it has been used in the treatment of meningococcus meningitis with favorable results (*22*). Recently, Davis (*23*) presented data in a preliminary report which suggest that the level of sulfonamides in the spinal fluid is approximately the same as the level of the "free" or active drug in the blood plasma. In the case of sulfathiazole, he found that in the presence of human plasma 75 percent of this compound was bound and only 25 percent of it was free. The latter amount corresponds to the relative value usually found in the spinal fluid. If Davis' explanation is correct, then a comparison of the relative blood levels of sulfonamides may not give a true index of the relative values of the compounds.

In addition to our observations on the protection of mice with the sulfonamides alone, it was found that the combined treatment of either sulfadiazine or sulfapyridine with specific antiserum protected more mice than could be expected from the additive effect of the two agents.

Furthermore, it was found that different strains of bacteria varied considerably in sensitivity both to the action of drugs and of antiserum and that there was no correlation in sensitivity. For example, the culture which was most sensitive to drugs was the one most resistant to the action of antiserum. It therefore seems that by using combined treatment the chances of administering an effective agent are greatly increased. It was mentioned in the introduction that the combined treatment has been used with favorable results by Lindsey, Rice, and Selinger (*6*), and by Alexander (*7*). According to the latter, in

the present state of our knowledge a combination of antibody and chemotherapy offers the best prognosis of *H. influenzae* meningitis.

SUMMARY

1. Using a single dose, in protecting mice against Type b *Hemophilus influenzae* infection, sulfadiazine was found to be the most effective; sulfathiazole and para-nitrobenzoic acid of similar activity were slightly better than sulfapyridine; sulfanilyl sulfanilamide was less active than sulfapyridine. Antibacterial action of sulfanilamide was demonstrable against only 1 of 6 strains.

2. *In vitro*, sulfadiazine, sulfathiazole, sulfapyridine, and sulfanilyl sulfanilamide either markedly retarded growth or killed the bacteria. The action of sulfadiazine and sulfathiazole was similar and slightly better than that of sulfapyridine; the action of sulfanilyl sulfanilamide was fairly close to that of sulfapyridine. In the presence of sulfanilamide the amount of growth was equal to or only slightly less than that in the control medium, except with one strain. In this instance, the bacteria were actually diminished in number. The results with para-nitrobenzoic acid were inconclusive.

3. Different bacterial strains with apparently the same virulence for mice showed marked variation in susceptibility to the same compound both *in vivo* and *in vitro*. In mice, slightly more than six times as much sulfapyridine was required to protect against the most resistant strain as compared with the least resistant one.

4. The results of treatment with a combination of sulfapyridine or of sulfadiazine with specific antiserum seemed to be better than an additive effect of the two agents.

5. Different bacterial strains also varied in susceptibility to the action of antiserum. This sensitivity was not correlated with drug sensitivity.

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DEATHS DURING WEEK ENDED NOVEMBER 28, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov. 28, 1942	Corresponding week 1941
Data from 87 cities of the United States:		
Total deaths	8,434	8,332
Average for 3 prior years	8,378	
Total deaths, first 47 weeks of year	390,191	388,198
Deaths per 1,000 population, first 47 weeks of year, annual rate	11.7	11.6
Deaths under 1 year of age	602	561
Average for 3 prior years	542	
Deaths under 1 year of age, first 47 weeks of year	26,977	24,660
Data from industrial insurance companies:		
Policies in force	65,271,636	64,683,252
Number of death claims	9,820	12,684
Death claims per 1,000 policies in force, annual rate	7.8	10.2
Death claims per 1,000 policies, first 47 weeks of year, annual rate	9.1	9.4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED DECEMBER 5, 1942

Summary

No unusual incidence of the communicable diseases was reported during the week. Of the 9 common communicable diseases included in the table on the following pages, the current incidence of only one—meningococcus meningitis—is above the 5-year (1937–41) median.

A total of 88 cases of meningococcus meningitis was reported, as compared with 93 cases for the preceding week, and a 5-year median of 35 for the corresponding week. The largest numbers of cases were reported in the Middle Atlantic (27), New England (16), and South Atlantic States (14). New York reported the largest number (15, 11 in New York City) for any State. Rhode Island reported 8 and Pennsylvania and Virginia 7 each. No other State reported more than 5 cases.

The number of cases of poliomyelitis increased from 69 to 79, of which 19 cases occurred in Texas and 18 in California. New York reported 7 cases. No other State reported more than 3 cases.

The incidence of influenza increased slightly, from 1,854 cases last week to 1,928 currently. Of the total, Texas reported 769, South Carolina 322, and Virginia 187, or 66 percent in these three States.

A total of 64 cases of endemic typhus fever was reported, as compared with 63 for the preceding week. To date, 3,419 cases have been reported, as compared with 2,998 for the entire year 1939 and 2,787 in 1941, the years in which the largest numbers of cases had previously been recorded.

Plague infection was reported in two specimens of fleas and in tissue from one rat in Tacoma, Wash.

Other diseases include 2 cases of anthrax (in Pennsylvania), 18 cases of smallpox (7 in Indiana and 4 in Kansas), and 17 cases of tularemia (9 in the East North Central States.)

The death rate for the current week in 88 large cities in the United States is 13.5 per 1,000 population, as compared with 11.9 for both the preceding week and the 3-year (1939–41) average. Excluding the mortality resulting from the Boston fire, the current rate is 12.8, which is still 7.5 percent above the rate for the preceding week and the 3-year average.

Telegraphic morbidity reports from State health officers for the week ended Dec. 5, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria: Week ended Dec. 5, 1942	Diphtheria: Week ended Dec. 6, 1941	Diphtheria: Median 1937–41	Influenza: Week ended Dec. 5, 1942	Influenza: Week ended Dec. 6, 1941	Influenza: Median 1937–41	Measles: Week ended Dec. 5, 1942	Measles: Week ended Dec. 6, 1941	Measles: Median 1937–41	Meningitis, meningococcus: Week ended Dec. 5, 1942	Meningitis, meningococcus: Week ended Dec. 6, 1941	Meningitis, meningococcus: Median 1937–41
NEW ENG.												
Maine	0	0	1	------	1	2	1	352	40	2	0	0
New Hampshire	0	0	0	------	------	------	101	8	3	0	0	0
Vermont	0	2	0	------	------	------	157	0	24	0	0	0
Massachusetts	3	2	6	------	------	------	370	141	211	5	5	1
Rhode Island	2	4	0	1	------	------	1	2	0	8	0	0
Connecticut	0	1	2	8	1	2	201	59	33	1	1	0
MID. ATL.												
New York	18	16	22	[1] 11	[1] 8	[1] 8	227	295	373	15	3	3
New Jersey	5	4	12	14	7	10	31	17	21	5	1	1
Pennsylvania	23	7	30	6	------	------	760	495	495	7	5	5
E. NO. CEN.												
Ohio	24	19	41	9	14	14	22	36	45	3	0	1
Indiana	9	17	25	16	47	32	44	17	17	0	1	1
Illinois	24	34	39	8	14	14	31	24	28	3	0	0
Michigan [2]	10	3	10	1	------	3	56	39	156	0	1	0
Wisconsin	0	1	2	16	4	47	128	0	82	0	2	0
W. NO. CEN.												
Minnesota	9	5	4	2	1	1	7	33	33	0	0	0
Iowa	2	2	4	------	2	1	21	32	37	0	1	1
Missouri	4	6	15	5	14	14	6	12	9	3	0	0
North Dakota	0	1	2	16	10	10	1	88	2	0	0	0
South Dakota	12	8	1	------	------	------	29	1	1	0	2	0
Nebraska	7	2	4	5	------	------	59	9	2	0	0	0
Kansas	15	5	6	2	8	9	27	110	32	0	0	0
SO. ATL.												
Delaware	0	0	0	------	1	------	3	2	3	0	0	0
Maryland [3]	6	12	11	15	3	4	8	85	8	4	4	1
Dist. of Col.	1	0	2	2	2	1	4	4	2	1	0	0
Virginia	23	40	38	187	250	145	13	202	69	7	0	0
West Virginia	10	12	15	14	6	6	4	230	11	0	2	2
North Carolina	37	70	64	3	6	6	5	267	141	0	0	2
South Carolina	16	19	19	322	409	371	3	29	20	0	0	1
Georgia	10	19	21	14	40	63	0	27	27	1	0	0
Florida	4	4	4	2	10	10	1	2	4	1	0	0
E. SO. CEN.												
Kentucky	9	16	16	3	6	12	37	175	76	2	2	2
Tennessee	4	13	13	29	30	40	8	51	21	1	1	1
Alabama	16	35	31	58	65	65	5	62	18	1	0	1
Mississippi [2]	10	18	17	------	------	------	------	------	------	0	1	1
W. SO. CEN.												
Arkansas	14	22	16	73	117	94	8	79	12	0	0	0
Louisiana	6	9	16	5	8	8	3	3	1	2	1	1
Oklahoma	17	17	21	60	104	88	3	6	6	0	1	0
Texas	45	83	57	769	1,245	354	16	250	64	3	1	1
MOUNTAIN												
Montana	2	2	2	------	10	10	15	52	10	0	0	0
Idaho	1	0	2	1	------	1	143	8	9	0	0	0
Wyoming	0	0	0	76	2	2	27	3	3	0	0	0
Colorado	10	13	10	50	49	28	10	41	41	1	0	0
New Mexico	2	3	3	1	------	2	4	12	12	2	0	0
Arizona	6	1	4	68	127	121	1	51	2	0	0	0
Utah [2]	7	0	0	3	10	11	362	29	29	1	0	0
Nevada	0	0	------	2	------	------	33	3	------	1	0	------
PACIFIC												
Washington	8	0	3	------	2	------	425	6	34	2	0	0
Oregon	1	2	2	29	16	17	235	40	15	2	0	1
California	29	20	89	22	93	63	61	509	160	4	0	1
Total	461	569	718	1,928	2,742	2,742	3,717	3,998	3,998	88	35	35
48 weeks	14,312	15,358	21,731	98,419	511,878	191,873	467,003	847,605	363,819	3,284	1,884	1,884

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended Dec. 5, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis: Week ended Dec. 5, 1942	Poliomyelitis: Week ended Dec. 6, 1941	Poliomyelitis: Median 1937–41	Scarlet fever: Week ended Dec. 5, 1942	Scarlet fever: Week ended Dec. 6, 1941	Scarlet fever: Median 1937–41	Smallpox: Week ended Dec. 5, 1942	Smallpox: Week ended Dec. 6, 1941	Smallpox: Median 1937–41	Typhoid and paratyphoid fever: Week ended Dec. 5, 1942	Typhoid and paratyphoid fever: Week ended Dec. 6, 1941	Typhoid and paratyphoid fever: Median 1937–41
NEW ENG.												
Maine	1	6	0	1	18	18	0	0	0	1	2	2
New Hampshire	0	1	0	7	3	4	0	0	0	0	0	0
Vermont	1	0	0	1	7	7	0	0	0	0	0	0
Massachusetts	0	5	1	285	268	140	0	0	0	1	3	1
Rhode Island	0	0	0	7	10	10	0	0	0	1	0	0
Connecticut	0	0	0	39	39	39	0	0	0	0	1	1
MID. ATL.												
New York	7	16	4	225	273	373	0	0	0	5	6	8
New Jersey	3	4	2	65	95	97	0	0	0	2	5	4
Pennsylvania	3	2	2	162	137	267	0	0	0	3	6	6
E. NO. CEN.												
Ohio	2	5	3	238	259	295	0	0	1	4	18	7
Indiana	1	0	0	43	99	153	7	10	10	1	1	1
Illinois	3	4	4	217	196	330	1	0	1	1	1	6
Michigan [2]	1	0	2	91	141	281	0	1	4	2	7	5
Wisconsin	1	1	3	135	140	151	0	1	2	0	1	0
W. NO. CEN.												
Minnesota	0	2	2	73	89	117	0	1	12	0	0	0
Iowa	0	0	1	48	42	86	1	4	6	1	0	1
Missouri	1	0	1	54	49	66	1	3	7	3	2	4
North Dakota	0	1	0	10	21	21	0	0	1	0	1	0
South Dakota	1	1	1	29	50	28	0	0	0	0	1	0
Nebraska	3	0	0	15	13	33	0	0	0	2	1	1
Kansas	3	1	0	53	88	100	4	1	1	1	1	1
SO. ATL.												
Delaware	0	0	0	17	22	22	0	0	0	0	0	0
Maryland [2]	0	1	0	36	61	52	0	0	0	3	4	4
Dist. of Col	0	0	0	33	15	15	0	0	0	1	1	0
Virginia	1	3	1	58	97	52	0	0	0	3	5	6
West Virginia	0	1	1	46	51	64	0	1	0	1	5	3
North Carolina	1	1	1	111	99	99	0	0	0	0	6	2
South Carolina	0	3	0	6	17	17	0	0	0	0	3	2
Georgia	0	2	1	43	42	34	0	0	0	3	5	5
Florida	0	0	0	13	7	5	0	0	0	2	2	2
E. SO. CEN.												
Kentucky	1	2	2	62	100	96	1	0	0	0	9	4
Tennessee	0	12	0	58	58	58	0	1	0	3	4	4
Alabama	1	8	2	44	42	35	0	0	0	1	0	1
Mississippi [2]	1	3	1	14	25	15	1	0	0	3	3	1
W. SO. CEN.												
Arkansas	0	1	1	14	5	17	2	1	1	3	7	6
Louisiana	0	3	1	19	14	14	0	0	0	3	9	9
Oklahoma	0	2	1	20	24	24	0	1	1	4	2	4
Texas	10	2	2	40	67	67	0	0	0	5	8	10
MOUNTAIN												
Montana	0	0	0	10	48	31	0	0	1	2	0	1
Idaho	0	0	0	8	3	12	0	0	0	0	0	1
Wyoming	0	0	0	2	8	8	0	0	0	0	0	0
Colorado	0	0	1	25	28	41	0	0	0	4	0	1
New Mexico	1	0	0	17	12	17	0	0	0	2	3	7
Arizona	1	0	0	6	4	4	0	0	0	1	0	0
Utah [2]	3	0	0	27	22	24	0	0	0	1	0	0
Nevada	0	0	------	0	2	--------	0	0	-----	0	0	------
PACIFIC												
Washington	0	2	2	27	25	46	0	0	1	0	0	1
Oregon	1	2	1	10	20	24	0	0	1	0	2	2
California	18	2	5	153	136	176	0	0	0	5	5	5
Total	79	99	91	2,717	3,091	3,880	18	25	50	78	140	140
48 weeks	3,981	8,899	8,899	115,871	116,073	147,380	737	1,286	9,161	6,453	8,023	12,265

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended Dec. 5, 1942—Con.

Division and State	Whooping cough, Week ended Dec. 5, 1942	Whooping cough, Week ended Dec. 6, 1941	Week ended Dec. 5, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	73	36	0	0	0	0	1	0	0	0	0
New Hampshire	14	19	0	0	0	0	0	0	0	0	0
Vermont	46	13	0	0	0	1	0	0	0	0	0
Massachusetts	258	218	0	0	2	0	1	0	0	0	0
Rhode Island	39	36	0	0	0	0	0	0	0	0	0
Connecticut	107	58	0	0	0	0	0	0	0	0	0
MID. ATL.											
New York	436	675	0	2	15	0	2	0	0	0	0
New Jersey	270	259	0	0	0	0	0	0	0	1	0
Pennsylvania	371	165	2	0	0	0	0	0	0	1	0
E. NO. CEN.											
Ohio	183	229	0	0	0	0	0	0	0	3	0
Indiana	15	17	0	0	0	0	0	0	0	1	0
Illinois	195	281	0	2	0	0	0	0	0	3	0
Michigan [2]	250	282	0	0	4	0	0	0	0	0	0
Wisconsin	195	354	0	0	0	0	0	0	0	2	0
W. NO. CEN.											
Minnesota	47	72	0	0	0	0	0	0	0	0	0
Iowa	31	22	0	0	0	0	0	0	0	0	0
Missouri	12	9	0	0	0	1	0	0	0	0	0
North Dakota	19	10	0	0	0	0	0	0	0	0	0
South Dakota	7	9	0	0	0	0	0	0	0	0	0
Nebraska	6	2	0	0	0	0	0	0	0	0	0
Kansas	29	84	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	6	11	0	0	0	0	0	0	0	0	0
Maryland [2]	109	28	0	0	0	12	1	0	0	0	0
Dist. of Col.	13	20	0	0	0	0	0	0	0	0	0
Virginia	34	85	0	0	0	20	0	0	0	0	1
West Virginia	33	40	0	0	0	0	0	0	0	0	0
North Carolina	55	142	0	0	0	0	0	0	0	0	3
South Carolina	13	44	0	0	0	0	0	0	0	0	3
Georgia	15	7	0	0	6	0	0	0	0	1	20
Florida	18	10	0	1	1	0	0	0	0	0	3
E. SO. CEN.											
Kentucky	17	90	0	0	0	0	0	0	0	1	0
Tennessee	42	43	0	0	0	0	0	0	0	0	0
Alabama	31	21	0	0	0	0	0	0	0	0	3
Mississippi [2]	-------	-------	0	0	0	0	0	0	0	0	1
W. SO. CEN.											
Arkansas	22	30	0	3	1	0	0	0	0	0	1
Louisiana	3	1	0	4	1	0	0	0	0	1	6
Oklahoma	5	4	0	0	0	0	0	0	0	0	0
Texas	173	120	0	2	69	0	0	0	0	0	23
MOUNTAIN											
Montana	20	41	0	0	0	0	0	0	0	0	0
Idaho	5	12	0	0	0	0	0	0	0	0	0
Wyoming	2	13	0	0	0	0	0	0	0	0	0
Colorado	11	50	0	0	0	0	1	0	0	1	0
New Mexico	16	32	0	0	1	0	0	0	0	0	
Arizona	9	11	0	0	0	47	0	0	0	0	0
Utah [2]	11	31	0	0	0	0	0	0	0	1	0
Nevada	0	8	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	26	160	0	0	2	0	0	0	0	0	0
Oregon	8	30	0	1	0	0	0	0	0	0	0
California	220	192	0	5	9	0	2	0	0	1	0
Total	3,525	4,126	2	20	111	81	8	0	0	17	64
48 weeks	165,897	195,672	-----	-----	-----	-----	-----	-----	-----	-----	-----

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended Nov. 21, 1942

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Baltimore, Md.	6	0	1	0	1	3	17	0	7	0	0	86
Barre, Vt.	0	0	------	0	63	0	0	0	0	0	0	0
Billings, Mont	0	0	------	0	0	0	1	0	1	0	0	4
Birmingham, Ala	0	1	7	0	0	0	2	0	2	0	0	0
Boise, Idaho	0	0	------	0	1	0	1	0	0	0	0	0
Boston, Mass	0	0	------	0	11	4	19	0	76	0	0	41
Bridgeport, Conn	1	0	1	1	0	0	6	0	3	0	0	1
Brunswick, Ga	0	0	------	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	------	2	18	0	11	0	8	0	0	14
Camden, N. J	0	0	------	1	1	0	1	0	4	0	0	13
Charleston, S. C	0		22	1	0	0	4	0	0	0	0	0
Charleston, W. Va	0	0	------	0	0	0	0	0	2	0	0	0
Chicago, Ill	17	0	1	2	14	1	27	3	48	0	0	78
Cincinnati, Ohio	5	0	1	0	6	0	1	0	31	0	0	6
Cleveland, Ohio	3	0	6	1	2	0	3	0	40	0	0	69
Columbus, Ohio	1	0	1	1	1	0	3	0	31	0	0	8
Concord, N. H	0	0	------	0	1	0	0	0	2	0	0	0
Cumberland, Md	0	0	------	0	0	0	1	0	0	0	0	0
Dallas, Tex	0	0	1	1	0	0	4	0	3	0	0	1
Denver, Colo	5	0	12	1	4	1	4	0	6	0	0	4
Detroit, Mich	1	0	------	1	11	1	10	0	52	0	1	118
Duluth, Minn	0	0	------	0	0	0	1	0	3	0	0	1
Fall River, Mass	0	0	------	0	0	0	1	0	10	0	0	4
Fargo, N. Dak	0	0	------	0	0	0	0	0	0	0	0	0
Flint, Mich	0	0	------	0	0	0	4	0	7	0	0	13
Fort Wayne, Ind	0	0	------	0	0	0	0	0	0	0	0	0
Frederick, Md	0	0	------	0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	------	0	0	0	4	0	1	0	0	0
Grand Rapids, Mich	0	0	1	0	0	0	1	0	1	0	0	6
Great Falls, Mont	0	0	------	0	0	0	0	0	2	0	0	2
Hartford, Conn	1	0	------	0	1	0	5	0	1	0	0	15
Helena, Mont	0	0	------	0	1	0	0	0	0	0	0	0
Houston, Tex	3	0	------	0	0	0	2	0	2	0	0	0
Indianapolis, Ind	0	0	------	0	3	0	10	0	11	1	0	8
Kansas City, Mo	0	0	------	1	1	0	2	0	24	0	0	1
Kenosha, Wis	0	0	------	0	0	0	0	0	6	0	0	0
Little Rock, Ark	0	0	------	0	0	0	2	0	1	0	0	1
Los Angeles, Calif	1	0	11	0	4	0	16	13	20	0	0	22
Lynchburg, Va	1	0	------	0	0	0	0	0	0	0	0	0
Memphis, Tenn	0	0	1	2	1	0	12	0	4	0	1	13
Milwaukee, Wis	0	0	1	1	48	0	5	0	66	0	0	18
Minneapolis, Minn	1	0	------	0	0	0	4	3	14	0	1	9
Missoula, Mont	0	0	------	0	0	0	1	0	0	0	1	0
Mobile, Ala	0	0	------	0	0	0	2	0	3	0	0	0
Nashville, Tenn	0	0	------	0	1	0	4	0	0	0	0	4
Newark, N. J	0	0	2	1	5	1	4	0	6	0	1	18
New Haven, Conn	0	0	------	1	0	0	2	0	3	0	0	17
New Orleans, La	0	0	1	0	2	0	13	0	1	0	0	1
New York, N. Y	12	0	16	0	10	9	57	1	138	0	3	128
Omaha, Nebr	0	0	------	0	0	0	4	0	1	0	0	0
Philadelphia, Pa	5	0	6	3	357	1	32	0	40	0	1	12
Pittsburgh, Pa	3	0	3	4	0	0	7	1	4	0	0	23
Portland, Me	0	0	1	1	0	0	0	0	3	0	0	25
Providence, R. I	0	0	------	0	0	0	0	0	0	0	0	1

City reports for week ended Nov. 21, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Pueblo, Colo	0	0	------	0	0	0	1	0	3	0	0	0
Racine, Wis	0	0	------	0	4	0	1	0	11	0	0	2
Reading, Pa	0	0	------	0	1	0	1	0	2	0	0	23
Richmond, Va	1	0	1	1	0	0	0	0	6	0	1	1
Roanoke, Va	1	0	------	0	2	0	0	0	3	0	0	0
Rochester, N. Y	0	0	------	0	1	0	5	0	5	0	0	16
Sacramento, Calif	3	0	------	0	0	0	1	0	4	0	1	4
Saint Joseph, Mo	0	0	------	0	0	0	1	0	0	0	0	0
Saint Louis, Mo	0	0	------	1	1	0	9	1	11	0	0	1
Saint Paul, Minn	0	0	------	0	0	0	3	0	6	0	0	27
Salt Lake City, Utah	0	0	------	0	69	0	0	0	7	0	0	6
San Antonio, Tex	3	0	1	1	0	0	1	10	1	0	0	3
San Francisco, Calif	1	0	------	0	10	1	11	0	5	0	0	10
Savannah, Ga	0	0	1	0	0	0	1	0	0	0	0	0
Seattle, Wash	0	0	------	0	11	0	6	2	0	0	1	5
Shreveport, La	3	0	------	0	0	0	9	0	2	0	0	0
South Bend, Ind	0	0	------	0	1	0	0	0	1	0	0	1
Spokane, Wash	0	0	------	0	27	0	0	1	1	0	0	0
Springfield, Ill	0	0	------	0	0	0	3	0	5	0	0	7
Springfield, Mass	0	0	------	0	2	0	5	0	[illegible]	0	0	4
Superior, Wis	0	0	------	0	0	0	0	0	3	0	0	6
Syracuse, N. Y	0	0	------	1	0	1	2	0	1	0	0	42
Tacoma, Wash	2	0	------	0	68	0	1	0	3	0	0	0
Tampa, Fla	0	0	------	0	0	0	1	0	0	0	1	0
Terre Haute, Ind	0	0	------	0	0	0	4	0	2	0	0	0
Topeka, Kans	0	0	------	0	1	0	0	0	7	0	0	0
Trenton, N. J	0	0	------	0	1	0	1	0	1	0	0	1
Washington, D. C	1	0	2	1	1	0	16	0	13	0	0	19
Wheeling, W. Va	0	0	------	0	1	0	1	0	2	0	0	15
Wichita, Kans	0	0	------	0	1	0	4	0	9	0	1	4
Wilmington, Del	0	0	------	0	0	1	1	0	0	0	0	3
Winston-Salem, N. C	0	0	------	0	0	0	2	0	1	0	0	5
Worcester, Mass	0	0	------	0	0	0	5	0	6	0	0	23

Anthrax—Cases: Philadelphia, 1.
Dysentery, amebic—Cases. New York, 1.
Dysentery, bacillary—Cases: Detroit, 3, Los Angeles, 6, New York, 5, Philadelphia, 1, Richmond, 2, San Francisco, 2.
Leprosy—New York, 1.
Tularemia—Cases: Detroit, 1, Pittsburgh, 1.
Typhus fever—Cases: Charleston, S. C., 1, Houston, 1, Nashville, 1, New Orleans, 1, New York, 1, Savannah, 2.

Rates (annual basis) per 100,000 population for the group of 87 cities in the preceding table (estimated population, 1942, 33,742,014)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Week ended Nov. 21, 1942	12.52	15.61	4.79	118.99	60.74	133.21	0.15	2.16	173.39
Average, 1937–41	19.05	16.08	[1] 3.57	[2] 142.24	[1] 53.94	120.38	0.78	4.53	171.91

[1] 3-year average, 1939–41.
[2] 5-year median.

PLAGUE INFECTION IN TACOMA, WASHINGTON

Under date of December 5, 1942, plague infection was reported proved in two flea specimens and in tissue of a rat taken in Tacoma, Wash.[1]

PSITTACOSIS

Reports of cases of psittacosis have been received as follows: Maryland, week ended August 22, 1942, 1; New York City, September 28, 1; Pennsylvania, week ended October 17, 4; Minnesota, week ended November 21, 1.

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[1] For previous reports of plague infection found in pools of fleas and lice in Tacoma, see Public Health Reports, October 30, 1942, p. 1670, and November 13, 1942, p. 1742.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended November 7, 1942.—During the week ended November 7, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		2		2	4					8
Chickenpox		13	10	147	231	55	72	21	102	651
Diphtheria		13	1	32	2	8	2	1	2	61
Dysentery							1			1
German measles		2		22	7		5	1	6	43
Influenza		2				8			43	53
Measles		1		23	91	1	128		13	257
Mumps	2	25		118	311	1	26	50	108	641
Pneumonia					17	1	2		12	32
Poliomyelitis		2		3		3		1	1	10
Scarlet fever		6	17	90	100	26	18	24	40	321
Trachoma									2	2
Tuberculosis	3	7	12	95	37	23	15	11	25	228
Typhoid and paratyphoid fever			1	30	1	1	1	1		35
Undulant fever									1	1
Whooping cough		23		216	95	12	15	40	38	439
Other communicable diseases		2		7	274	46		2	4	335

COSTA RICA

Communicable diseases—August 1942.—During the month of August 1942, certain communicable diseases were reported in Costa Rica as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	14	1	Typhoid fever	23	1
Measles	36		Whooping cough	8	
Poliomyelitis	3				

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Argentina—Cordoba Province.—Plague was reported in Cordoba Province, Argentina, as follows: March 1–31, 9 cases, 4 deaths; April 1–30, 3 cases; May 1–31, 3 cases; July 1–31, 1 case; September 1–30, 2 cases; October 1–31, 1 fatal case.

Indochina.—For the period November 1–10, 1942, 1 case of plague was reported in Indochina

Typhus Fever

Egypt—Port Said.—For the week ended November 7, 1942, 3 cases of typhus fever were reported in Port Said, Egypt.

Rumania.—For the period November 1–10, 1942, 41 cases of typhus fever were reported in Rumania.

Turkey.—For the period November 1–10, 1942, 6 cases of typhus fever were reported in Turkey.

Yellow Fever

Togo.—During the week ended October 10, 1942, 1 case of yellow fever was reported in Togo.

COURT DECISION ON PUBLIC HEALTH

Milk—ordinance provisions upheld.—(California Supreme Court; *Natural Milk Producers Ass'n et al.* v. *City and County of San Francisco et al.*, 124 P.2d 25; decided April 2, 1942, as modified April 21, 1942.) A comprehensive milk ordinance of the city and county of San Francisco provided that market milk for sale and distribution for human consumption should consist of (a) certified milk, (b) guaranteed pasteurized milk, (c) grade A pasteurized milk, and (d) grade B pasteurized milk, and that no other milk should be sold for human consumption within the city and county. In effect the ordinance prohibited the sale of milk unless it was pasteurized, with the single exception of certified milk. In a suit to enjoin the enforcement of certain provisions of the ordinance, the plaintiffs, who were interested in the sale of guaranteed raw milk being permitted in San Francisco, first contended that the ordinance was invalid because it conflicted with the State law as embodied in the agricultural code. They asserted that that code permitted the sale of five grades of market milk, namely, certified, guaranteed raw, guaranteed pasteurized, grade

A raw, and grade A pasteurized, and that the ordinance prohibited the sale of guaranteed raw milk and grade A raw milk. The plaintiffs' view was that the agricultural code so completely occupied the field of milk regulation that there was no room for the operation of a municipal ordinance on the subject, but the Supreme Court of California said that it had long been the established general rule, in determining whether a conflict existed between a general and local law, that where the legislature had assumed to regulate a given course of conduct by prohibitory enactments a municipal corporation with subordinate power to act in the matter could make such additional regulations in aid and furtherance of the purpose of the general law as might seem appropriate to the necessities of the particular locality and as were not in themselves unreasonable. Mention was also made of section 451 of the agricultural code which provided in part: "No provision of this division, except subdivision (b) of section 458.1, or any rule and regulation of the director is a limitation on the power of a municipality or county to provide for reasonable additional regulations not in conflict therewith requiring standards higher than the minimum requirements for the grades of market milk established in this division." In answer to the plaintiffs' assertion that section 451 left to municipalities only the field of imposing stricter requirements upon the various grades of milk as established by the agricultural code and did not permit the complete prohibition of the sale of any one of the grades, the supreme court said that it was doubtful that there were more than three grades of milk specified in the said code, namely, certified, guaranteed, and grade A. "The latter two grades might be said to be divided into two kinds, raw and pasteurized." The court's view was that the ordinance merely imposed the additional restriction that the milk, whether it be guaranteed or grade A, had to be pasteurized and that, essentially, the requirement in the ordinance of pasteurization for both guaranteed and grade A milk was merely a higher standard for the grades which was not in conflict with the State law.

Another contention of the plaintiffs was that the ordinance was unconstitutional because discriminatory. They asserted that there was no substantial difference between guaranteed raw milk as defined in the agricultural code and certified milk as defined in the ordinance and that, therefore, there was no reasonable basis for forbidding the sale of one and not the other. The court, however, found itself unable to say that the ordinance was invalid on the ground stated, saying that a comparison of the two standards revealed without doubt that there was a substantial and reasonable difference which was directly related to the public health. The standards for guaranteed raw milk were reviewed and then the court proceeded to say that the standards for certified milk were quite similar but that, in addition, it was required

in the ordinance that certified milk conform "to the rules, regulations, methods, and standards for the production * * * of certified milk adopted by the American Association of Medical Milk Commissions and must bear the certificate of the milk commission of the San Francisco County Medical Society." It would seem, said the court, that, whatever may be the rules and regulations of the association, certified milk may be said to be subjected to a more rigid inspection than guaranteed raw milk by persons exceptionally well qualified therefor, that is, physicians and surgeons. "Furthermore, the agricultural code recognizes certified milk as being in a class by itself."

In their attack upon the ordinance, the plaintiffs also invoked the due process clause but, according to the court, it could not be said that the city and county had no reasonable grounds for requiring all milk sold therein to be either pasteurized or certified. It was true that the sale of milk was a lawful business protected by the Federal and State constitutions, but it could not be doubted that, as milk was vital to the welfare of the nation and susceptible of being a carrier of disease, the production, distribution, and sale thereof could be strictly regulated under the police power to safeguard the public health. The requirement that all milk be pasteurized was a proper police regulation and the fact that an exception was here made with reference to certified milk did not alter the situation. "Certified milk has long been established as milk in which especial precautions are taken to insure absence of disease and contamination, and the supervision is by especially qualified experts."

Another point urged by the plaintiffs was that there was an unconstitutional delegation of legislative power in that portion of the ordinance which provided that certified milk was market milk which conformed to the rules, regulations, methods, and standards adopted by the American Association of Medical Milk Commissions and had to bear the certificate of the milk commission of the San Francisco County Medical Society. The named association was said by the court to be a corporation, with its principal place of business in New York, whose members were the various local milk commissions throughout the nation. The San Francisco County Milk Commission consisted of five members appointed by the county medical society and a fee was charged those desiring to produce and sell certified milk to cover the costs of inspection and to purchase from the association the caps to be used on the containers. Legally the commission was not an administrative agency of either San Francisco or the State. But the court held that there was no unlawful delegation of legislative power, saying that, in conformity with the rule that when it may reasonably be done a statute should be interpreted in a manner that would avoid its being declared unconstitutional, it believed that "the requirement in the ordinance may be said to merely require that certi-

fied milk must meet standards established by a private corporation or group who are experts in the field, and that the legislative body was aware of those regulations and standards and by the ordinance merely made them a part thereof."

The judgment in favor of the defendants was affirmed.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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EXPERIMENTAL CHEMOTHERAPY OF BURNS AND SHOCK I. METHODS. II. EFFECTS OF LOCAL THERAPY UPON MORTALITY FROM SHOCK[1]

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The experimental approach to the evaluation of therapeutic agents employed in burns and shock has been a difficult task and the results obtained have been to a large measure controversial. The use of large laboratory animals has been complicated by such factors as anesthesia, difficulty in producing a uniform degree of shock, brief duration of experiments, and the inability to employ under uniform conditions a sufficient number of animals to yield values of statistical significance. No review of the literature will be attempted. Recent surveys in this field have been made by Wiggers (*1*) and by Harkins (*2*).

The need for a simplified procedure that can be carried out upon small laboratory animals is apparent. This seemed to be best filled by exposing mice to a standardized degree of heat and accepting the time-mortality curve as a criterion of assay. As the work has progressed several factors responsible for variations have been revealed, and an increasing uniformity in the production of shock has been realized.

I. Methods

Female albino mice of an inbred strain raised at the Institute were employed. They were allowed free access to food and water at all times. The hair was removed from the posterior two-thirds of the animal by means of electric clippers. The line of shearing was extended approximately to the level of the xyphoid process.

Anesthesia was produced by dropping the mouse in the bottom of a large jar containing coarse mesh wire gauze placed over a layer of cotton which had been saturated with ether. Anesthesia was obtained in 10 to 20 seconds. The burn was produced by seizing the animal behind the neck with a pair of forceps and immersing the shaved

[1] From the Division of Chemotherapy, National Institute of Health.

area into a beaker of water maintained at a constant temperature. The forelegs were held in such a position that the forepaws were often also immersed. The animal was dried by gently blotting with paper towels, and placed upon sawdust in a bucket. Only a few seconds of exposure are required so that within 1 to 2 minutes from the onset of anesthesia the animal is able to run about the bucket. Mice can be subjected to this exposure at the rate of two per minute. In a given experiment all exposed mice are placed together to insure homogeneity, and then selected by rotation for each group to be studied.

After experimenting with temperatures from 50° to 99° C., a selection of 70° C. was made as best suited to our needs. At this temperature, dependent upon length of exposure and other factors to be discussed, three types of effects can be obtained: (*a*) Animals exposed for 10 seconds die within a few hours. (*b*) Following exposure for 3 to 5 seconds the animals recover from the acute effects and run about the cage for several hours, showing irritability and increased respiratory rate. They gradually develop increasing dyspnea and prostration and from 30 to 100 percent die within 3 days. Some hours prior to death the skin becomes cold and clammy. (*c*) Mice surviving this period usually die within 3 days to 3 weeks with symptoms and gross autopsy findings indicative of toxemia and secondary infection. It is possible to adjust conditions so that the majority of deaths occur within this period.

Locally, swelling of the legs and tail develops within an hour following immersion. Within 1 to 2 days gangrene of these parts begins. In most animals this is of the dry type with shrinking of the affected areas; in others, the legs and tail remain swollen and moist, with infection appearing in those animals that have a sufficiently long period of survival.

HEMOCONCENTRATION

The presence of hemoconcentration was established in a series of mice as a corollary to the observed symptoms of shock. Hemoglobin determinations were made the day prior to exposure in 10 mice weighing 28 to 33 gm., upon 0.01 ml. of blood obtained from the tail. Five and one-half to seven and one-half hours after an exposure of 4 seconds at 70° C., the determinations were repeated upon blood obtained from the heart, as local edema fluid made values from tail blood inaccurate. A mean of 127 percent (table 1) of the control value was obtained, which is significant in view of the fact that under these conditions only part of the animals die within the first few days.

TABLE 1.—*Hemoglobin values before and 5½ to 7½ hours after production of a standardized burn in 10 mice*

[Exposure 4 seconds at 70° C.]

Hemoglobin before exposure (Gm. percent)	Hemoglobin after exposure (Gm. percent)
13.5	16.5
10.5	14 0
13.5	17.5
12.5	18 3
12 6	15.0
16 5	18 7
15.8	21.4
14.0	18.5
14 5	16 8
13 8	17.8
[1] 13.72	[1] 17.45

[1] Mean.

INFLUENCE OF AGE AND ENVIRONMENTAL TEMPERATURE

While a sufficient number of control animals was employed in each experiment to make deviations significant, it was desired to obtain time-mortality curves, as uniform as possible, upon the controls. The age (size) of the mice and the temperature of the room were found to affect results appreciably.

Mice of 30 to 35 gm. were immersed for 4 seconds in water at 70° C. and groups of 15 were placed (*a*) in the cold room at 5° C., (*b*) in the incubator room at 37° C., (*c*) in a room maintained at 26 6° to 30° C., (*d*) in a room at 18.3° to 20.5° C.

Animals in groups (a) and (b) died within 10 hours. The mortality curve of group (d) was appreciably higher than that of group (c) (fig. 1). The sensitivity of these animals to changes in environmental temperature suggests that a disturbance in the ability to regulate body temperature may be an important factor in the mechanism of shock produced by extensive scalds. The unfavorable influence of heat and cold are of interest in view of the recent experiments of Blalock (*3*) and Wiggers (*4*) on the survival time of anesthetized dogs with traumatic shock, as influenced by the local and general applications of heat and cold to the body. Their results suggested a possible beneficial effect from cold.

In addition to the large mice employed in the above experiments, a group of 15 mice weighing 14 to 18 gm. were included and kept in the room with group (c) at 26.6° to 30° C. The young animals proved to be much more susceptible to thermal shock, with a mortality of 80 percent within 24 hours, as compared to 20 percent for the older mice.

It is evident that mice of a fairly uniform size kept at an even room temperature are prerequisites for the standardization of a time-mortality curve. There are undoubtedly other influences, such as the degree of hydration of the animal, relation to feeding, etc., that deserve study. In the latter part of the work reported below it was attempted to employ mice weighing 20 to 25 gm. for all experiments and to maintain the room temperature between 26.6° and 30° C.

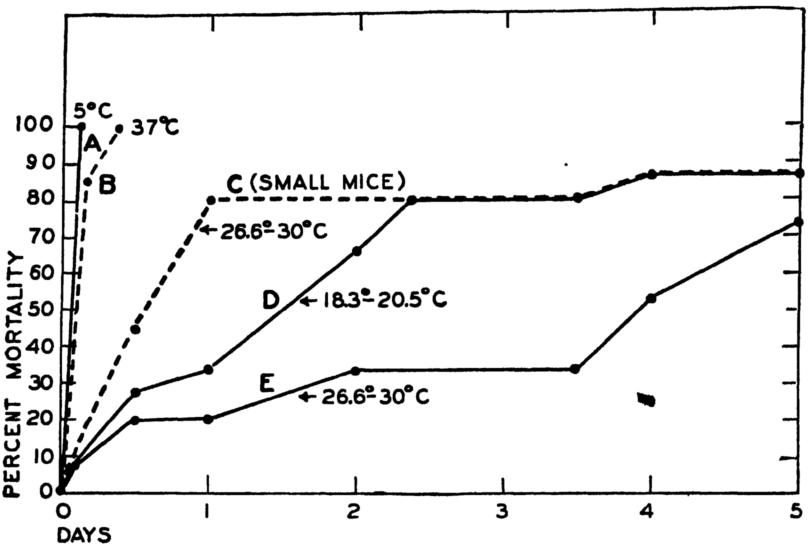

FIGURE 1.—The influence of size of mice and of room temperature on early mortality following a standard burn. In curve C, mice of 14 to 18 gm. were used. All others were old mice of 30 to 35 gm. Fifteen mice were in each group and were immersed in water at 70° C. for 4 seconds.

II. Effects of Local Therapy upon Mortality from Shock

For the assay of therapeutic measures it was desired to have 40 to 60 percent of the control animals succumb within 3 days. The majority of experiments fall within this range. However, when these experiments were begun, the influence of age and of room temperature was not fully appreciated. Mice of fairly uniform size were always used for each experiment, but variations have been present in different experiments, and the mortality curves among control groups have likewise varied. However, the significant criterion is the deviation from the control which occurs as a result of treatment, and these deviations have in repeated experiments yielded results of a constancy that testify to the reliability of the procedure and that can be subjected to statistical analysis. In some cases it may be advantageous to have high or low control curves in order to bring out better the influence of therapy.

The temperature of the water into which the mice were immersed was 70° C. in all cases. With a few exceptions the length of exposure was 4 seconds. The occasional mouse that showed immediate collapse as a result of exposure was discarded before selection into groups was made. An average of approximately 1 hour elapsed between exposure to heat and institution of therapy. Local therapy was applied by dipping the exposed area of the animal into a small conical glass containing the substance to be tested.

EFFECTS OF COD LIVER OIL AND MINERAL OIL

Three experiments each were performed to test the therapeutic effects of cod liver oil, U. S. P., and mineral oil, light, U. S. P. The mice were dipped into the oil within an hour after the scald and again 24 hours later.[2] In all experiments a striking increase in mortality during the first 3 days occurred as a result of this treatment; no appreciable difference was observed between cod liver oil and mineral oil. The mortality curves in the former group were slightly higher, but in both cases the increase in mortality, as compared with the corresponding controls, was doubled during the first 3 days as a result of treatment (table 2, figs. 2 and 3).

TABLE 2.—*A summary of experiments showing the influence of various substances applied locally on the acute mortality of mice subjected to a standardized burn. The difference between the mortality of the control and of the treated groups and its probable error ($P.E._{Diff.}$) is shown on each day following the burn*[1]

	Number of mice	1 day—percent mortality	Difference ± P. E. Diff	2 days—percent mortality	Difference ± P. E. Diff	3 days—percent mortality	Difference ± P. E. Diff
Cod liver oil	41	95.1	47.5±5.7	100	47.6±5.2	100	38.0±5.1
Controls	42	47.6		52.4		62	
Mineral oil	44	70.5	35.7±6.6	81.8	42.6±6.2	88.6	43.0±5.9
Controls	46	34.8		39.2		45.6	
10 percent tannic acid solution	44	75	37.3±6.7	84.1	44.1±6.1	84.1	41.9±6.3
Controls	43	37.7		40		42.2	
Tannic acid-sulfadiazine ointment	37	54	24.8±7.3	64.8	28.2±7.3	70.2	16.6±7.3
Controls	41	29.2		36.6		53.6	
5 percent sodium sulfadiazine	29	96.5	43.2±6.6	96.5	43.2±6.6	96.5	43.2±6.6
Controls	30	53.3		53.3		53.3	
Ringer's solution	48	50	18.7±6.6	60.4	8.3±6.6	62.5	12.5±6.3
Controls	48	68.7		68.7		75.0	
Epinephrine	34	35.3	38.2±7.5	44.1	29.4±7.7	55.8	26.7±7.2
Ringer's solution	34	55.8	17.7±7.7	61.7	11.8±7.6	64.7	17.8±7.1
Controls	34	73.5	----------	73.5	----------	82.5	----------

[1] Dr. Selwyn D. Collins, Principal Statistician of the Division of Public Health Methods, kindly conducted the statistical analysis of this material.

The mechanism is not known by which application of oil to large areas of body surface following burns brings about an increase in early mortality.

[2] It was not possible to prevent the oil from spreading over the unburned area.

EFFECTS OF TANNIC ACID

Three experiments were carried out with 10 percent aqueous solutions of tannic acid, U. S. P. Two batches of the drug were used. The mice were immersed in the solution at 1, 4, 7, and 24 hours follow-

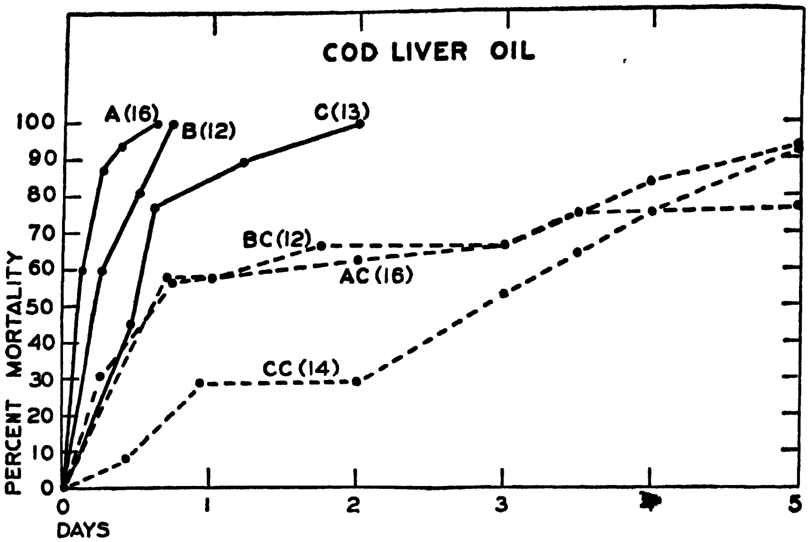

FIGURE 2.—The effect of external application of cod liver oil on early mortality following burns. Curves A, B, and C are treated animals; AC, BC, and CC are the corresponding controls. Figures in parentheses indicate the number of mice used.

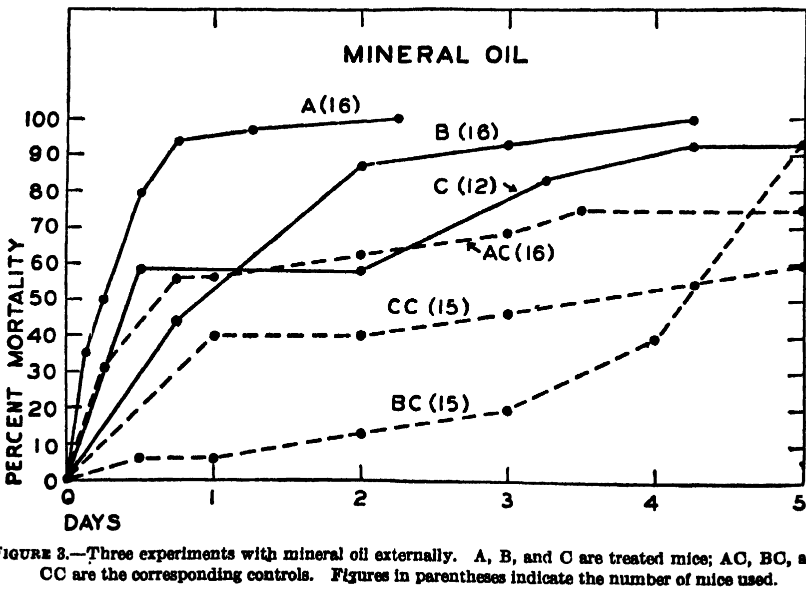

FIGURE 3.—Three experiments with mineral oil externally. A, B, and C are treated mice; AC, BC, and CC are the corresponding controls. Figures in parentheses indicate the number of mice used.

ing the burn. In these experiments early mortality was doubled as a result of this treatment (table 2 and fig. 4).

An experiment with tannic acid solutions in concentrations of 2.5, 10, and 20 percent indicated a correlation between the strength of the solution and the increase in mortality resulting from its use (fig. 5).

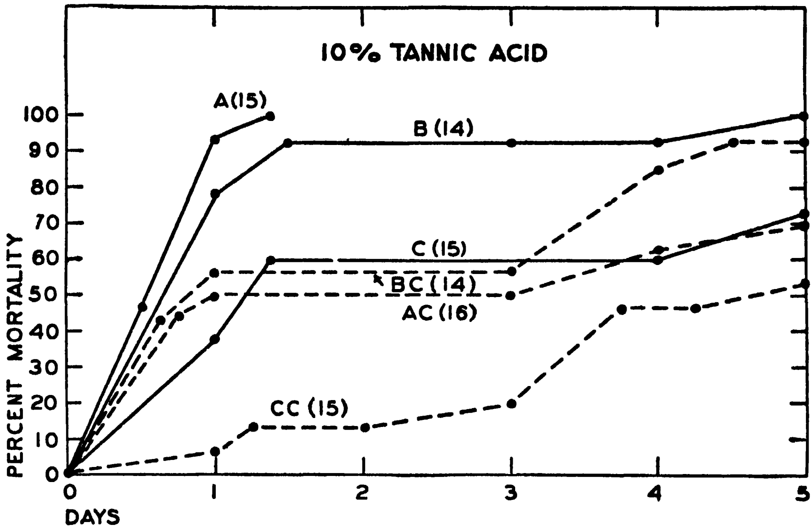

FIGURE 4.—Three experiments with 10 percent tannic acid solution locally. A, B, and C are treated mice AC, BC, and CC are the controls.

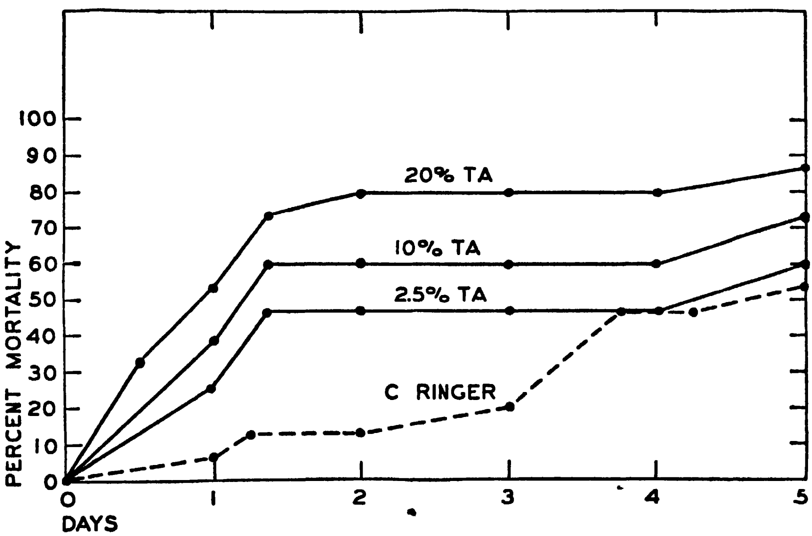

FIGURE 5.—One experiment with varying concentration of tannic acid locally. Controls were dipped in Ringer's solution. Fifteen mice were in each group.

An ointment of 10 percent tannic acid and 5 percent sulfadiazine made according to a recommended formula[8] was employed in three experiments with 37 mice and 41 controls. The ointment was applied

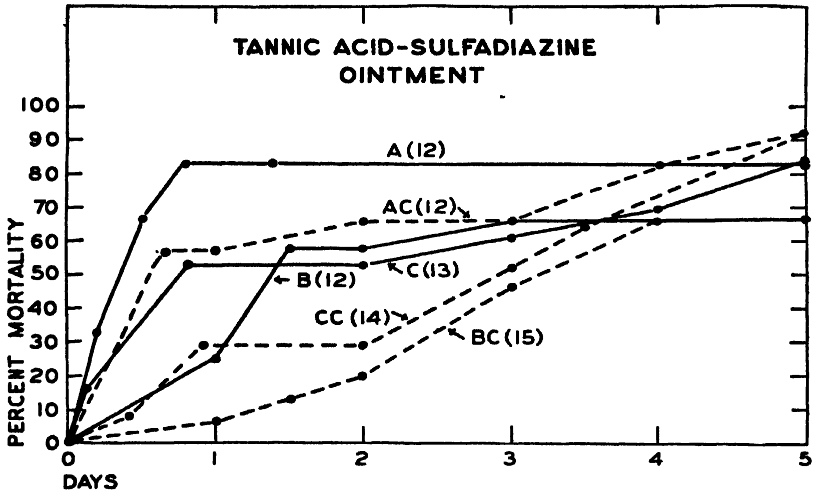

FIGURE 6.—Three experiments with an ointment containing 10 percent tannic acid and 5 percent sulfadiazine in a pectin base. A, B, and C are treated animals; AC, BC, and CC are the controls. The number of mice used is shown in parentheses.

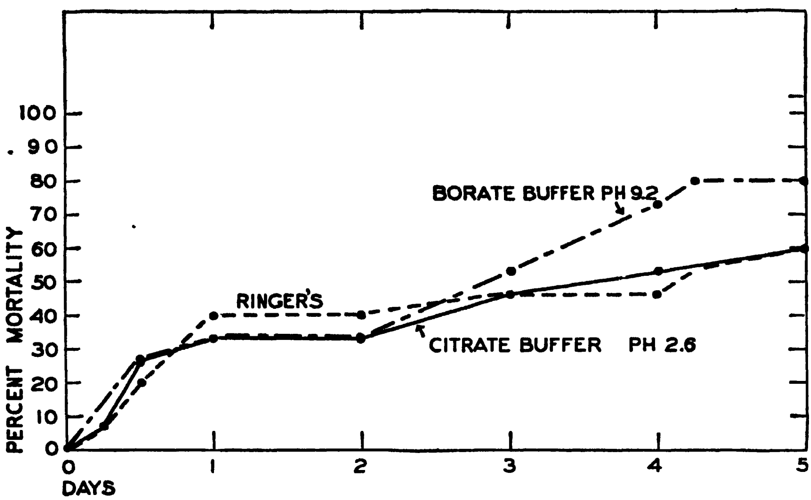

FIGURE 7.—The absence of effect of local applications of buffer solutions of pH 2.6 and 9.2 as compared with Ringer's solution, on early mortality following burns. Fifteen mice were in each group.

[8] Suggested in J. Am. Pharmaceut Assoc, 3. 236 (1942). This ointment contained tannic acid 10 percent, sulfadiazine 5 percent, glycerin 12 percent, sodium sulfite 0 2 percent, Ringer's solution 67.6 percent, and pectin 5 percent.

within an hour of the burn and repeated in 24 hours. The mortality of the treated animals was 54.2 percent in 1 day and 70.5 percent in 3 days as compared to 29.2 and 53.6 percent among the controls (table 2, fig. 6). Later experiments revealed that sulfadiazine applications did not appreciably influence the mortality curve, and it is believed that the increase in mortality rate resulted from the tannic acid present. It remains to be established whether systemic absorption of tannic acid through the burned area contributed to this effect.

In order to eliminate the possibility that the increased mortality was due to the acidity of the preparations, a group of 15 mice were

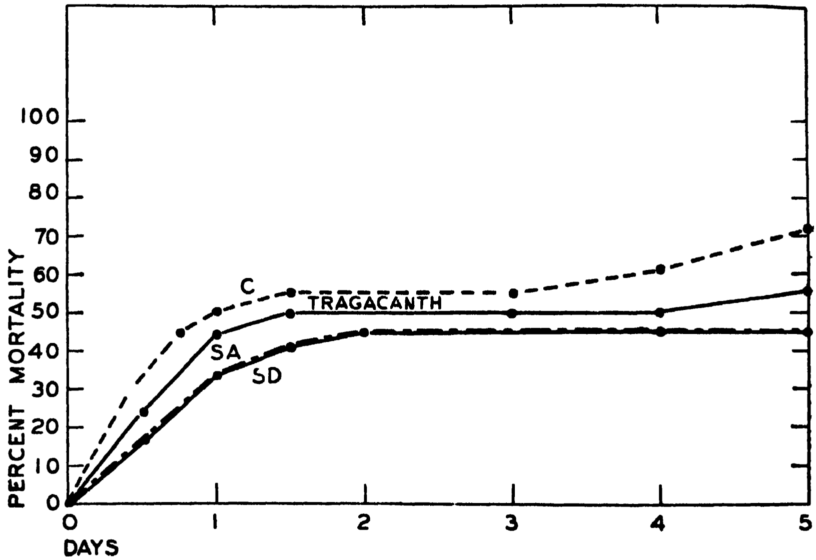

FIGURE 8.—The absence of effect of 5 percent sulfanilamide and 3 percent sulfadiazine jelly, and of tragacanth jelly alone, as compared to untreated animals. Fifteen mice were in each group.

immersed in McIlvaine's citrate-phosphate buffer of the same pH (2.6) as a 10 percent solution of tannic acid. As compared to immersion in Ringer's solution, no effect on the mortality curve was produced (fig. 7).

SULFANILAMIDE, SULFADIAZINE, AND SODIUM SULFADIAZINE

Because of the stickiness of the pectin ointment, a jelly of 2 percent tragacanth in water was used as a vehicle in these experiments. With 18 mice employed in each group it was found that three applications of the tragacanth jelly alone, the jelly with 5 percent sulfanilamide, and the jelly with 3 percent sulfadiazine did not appreciably affect the time-mortality curve (fig. 8).

Two experiments were made with a 5 percent aqueous solution of sodium sulfadiazine upon 29 mice. Mice were immersed in this solution at 1 hour, 5 hours, and 24 hours after the scald. The results compared with 30 controls showed approximately double the early mortality (table 2, fig. 9).

Since sulfadiazine jelly did not increase the mortality from shock while sodium sulfadiazine solutions did to a significant degree, experiments were conducted on the effect of pH, and also upon the systemic absorption of sodium sulfadiazine through normal and burned skin.

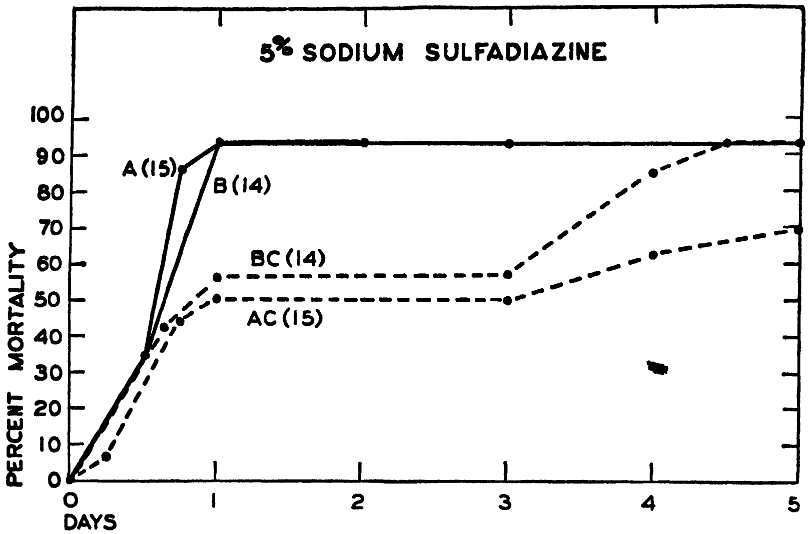

FIGURE 9.—Two experiments on early mortality of burned mice as influenced by local application of a 5 percent sodium sulfadiazine solution. A and B are treated animals, AC and BC are controls. The number of animals in each group is shown in parentheses.

A group of scalded mice were immersed in M/20 sodium borate solution the pH (9.2) of which was similar to that of a 5 percent sodium sulfadiazine solution. Immersion in borate buffer did not alter the time-mortality curve as compared to controls dipped in Ringer's solution (fig. 7).

Ten shaved normal mice of 16 to 18 gm. in weight were immersed in a 5 percent solution of sodium sulfadiazine at 9 a. m. and at 1 p.m. During the day, each mouse was kept in a small wire cylinder fitting sufficiently close so that licking the skin was not possible. Between 4 and 5 p. m. the animals were anesthetized and heparinized blood drawn from the heart with a capillary pipette, using precautions to avoid contamination of the blood with the sulfadiazine on the skin. Determinations made upon 0.05 to 0.1 ml. of blood gave the following values for free sulfadiazine: 2.64, 2.7, 4.0, 4.2, 2.0, 4.5, 6.6, 9.0, 6.0, and 8.0 mg. percent (mean = 4.96 mg. percent).

This experiment was repeated with mice that had received the standard burn one-half hour before the first immersion in sodium sulfadiazine. Two mice died before completion of the experiment. The following values were found: 20, 21.6, 20, 20.1, 23, 18.8, 28, and 20 mg. percent (mean = 21.44).

The validity of the technique was checked by dipping three normal shaved mice into 5 percent sodium sulfadiazine and obtaining blood samples immediately after. No sulfadiazine was detected.

Our results indicate that sufficient sodium sulfadiazine can be absorbed from the burned area to contribute materially to the increased mortality observed under these conditions. Other experiments which we have done suggest that this absorption is greater in young mice than in old. That absorption of sulfadiazine can occur through burned human skin is also indicated by the report of Pickrell (*5*).[3] These findings are contradictory to the earlier experimental work of Underhill (*6*) on the absorption of strychnine. To demonstrate the absorption of strychnine through a burned area 5 mice were dipped in a 1 percent solution of strychnine sulfate one-half hour after the burn and placed in wire cyclinders as above. All died in convulsions within 10 minutes. Five normal mice similarly treated remained well during the 7 hours they were kept in the cylinders.

EPINEPHRINE, POSTERIOR PITUITARY EXTRACT, AND RINGER'S SOLUTION

In three experiments 48 mice were immersed in Ringer's solution or 0.8 percent saline four times during the first day and three times the second day following the burn. As compared to 48 controls a slight decrease in mortality rate was observed (table 2). The addition of 1-20,000 epinephrine to the solutions brought about an additional decrease in the mortality curve to an extent that is significant statistically (table 2, fig. 10). In two experiments there were 34 mice treated with epinephrine, 34 with saline, and 34 controls. The mortality in the epinephrine group was approximately half that of the controls during the first 48 hours.

In one of these experiments an additional group of 15 mice were treated with pituitary powder, 1-8,000. Results comparable to those with epinephrine were obtained. It cannot yet be stated whether the favorable effects of these hormones are due to their local action or to systemic effects as a possible result of absorption through the scalded area. It is of interest that Douglas (*7*) in 1923, on the basis of experimental work, advocated the use of epinephrine packs to produce local vasoconstriction in the therapy of burns.

[3] The solution of sulfadiazine used by Pickrell does not contain the free compound but a salt formed with triethanolamine analogous to an ammonium salt.

COMMENT

It is believed that the methods outlined will be useful as a means of studying the effects of various agents upon mortality from shock. It must be strongly emphasized that results obtained in this study are not concerned with the effects upon the healing of local lesions. The treatment of burns has been dealt with only insofar as such treatment influences the early mortality from shock and is, therefore, of significance only in extensive and severe burns. That this is an important consideration is shown by the fact that, in man, from 60 to 80 percent

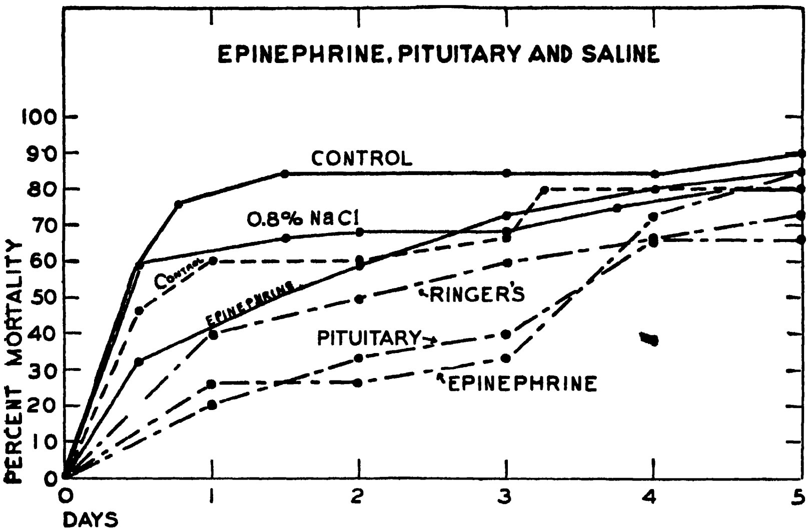

FIGURE 10.—The influence of 1-20,000 epinephrine and 1-8,000 posterior pituitary powder on the early mortality of burned mice as compared with Ringer's or saline applications and with untreated controls. Broken lines represent one experiment with 15 mice in each group; continuous lines, another experiment with 19 mice in each group.

of the deaths from extensive burns occur within the first few days as the result of shock (*8*).

It must also be pointed out that these experiments deal with mortality rates and not ultimate survival. Irrespective of early differences, the curves tended to approach each other after the third day.

This method of study should be useful in evaluating the effects of systemic therapy, including blood and blood substitutes, in shock and toxemia; work is being done on this problem. Whether or not with a modified procedure the time-mortality data will afford information of value in the investigation of the later stages of burns remains to be established.

SUMMARY

A procedure is described whereby a standardized burn is produced in mice. Conditions can be adjusted so that the majority of animals

succumb either during the first few days from shock or later from toxemia and secondary infection.

The age of the mouse and the environmental temperature have been found to influence appreciably the early mortality (within 3 days) following burns. Young mice were more susceptible than old. Any degree of cooling, as well as excessive heating of the room, exerted an unfavorable effect.

A study of agents commonly used in the local therapy of burns revealed that significant increases in early mortality were produced by cod liver oil, mineral oil, tannic acid solutions and ointment, and 5 percent sodium sulfadiazine when applied to a scalded area comprising approximately two-thirds of the body surface.

No significant effect upon early mortality was observed following the application of a 5 percent sulfanilamide jelly or 3 percent sulfadiazine jelly.

Ringer's solution or 0.8 percent saline lowered the early mortality slightly below control values. The addition of epinephrine or posterior pituitary extract to the solution caused a further decrease in mortality, believed to be a significant deviation from the control.

The present study bears upon burns only insofar as their relation to shock is concerned.

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OBSERVATIONS ON THE EPIDEMIOLOGY OF LEPROSY

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It is not sufficiently well known that at present in many parts of the world leprosy exhibits a tendency to disappear, or at least not to perpetuate itself, while in other parts of the world it tends to spread freely; that is, enough new cases develop to keep the number of lepers relatively constant. These facts are nowhere better illustrated

than in the United States where new cases develop to an extent that makes the disease a matter of public health concern only in certain States bordering on the Gulf of Mexico; elsewhere spread does not occur, or only so slightly as to be of no material importance to the community. These facts, though well known to those who have made a special study of the disease from the public health point of view generally, have not been taken into account in formulating public health laws and regulations of the various States.

Before analyzing in detail the situation in the United States it will be advisable to consider the problem as presented in Europe. There at present leprosy spreads appreciably only in the countries bordering on the Mediterranean and the Baltic. Elsewhere the few cases that develop are due to spread from imported cases and are not a remnant of the leprosy that was so prevalent in the Middle Ages. Endemic leprosy stemming from the widespread distribution of the disease in the Middle Ages is believed to have disappeared from the British Isles about the end of the eighteenth century. The very few cases developing there in the past century or more have been due to infection from imported cases. Many persons suffering from leprosy that was acquired in the colonial parts of the empire go to England either to secure treatment or because it is the home country and has a very liberal policy in dealing with this disease from the public health point of view.

It is well known that at present the tendency of leprosy to spread in the British Isles is so feeble that health authorities make no attempt to control it and that whatever measures are taken by patients are self imposed. This attitude is well justified by experience but it must not be assumed that leprosy never is transmitted in Britian. This is well illustrated by a report made by MacLeod (*1*) in 1925. He reported four cases in persons who never had been out of England; three acquired the disease in childhood, and one in adult life. All were close family contacts of adults who had acquired the disease in countries known to be foci of the infection.

That not everyone is comfortable about the leprosy situation in England is shown by the fact that the matter has come up in Parliament occasionally. In 1938 a short discussion of the subject took place in the House of Commons in which it developed that there were 60 to 100 lepers at large in the country, while there were special facilities for the care of only 12. The Ministry of Health reported that while leprosy was not required to be reported in England the authorities had information of 38 lepers and that in only 4 cases over a long period of years had infection occurred in England. Dr. MacLeod (*2*) has expressed the view that in some cases there is danger of infection and that supervision is advisable.

Flandin and Ragu (*3*) report on 95 cases of leprosy seen in recent years in Paris, France, and vicinity, but only 6 of these were regarded as infected in Paris and the surrounding region. Of these 6, 4 gave histories of close association with lepers, while 2 gave no such histories, but in each case there was mentioned possible sources of infection.

There appears to have been little published on leprosy in Germany except in relation to the outbreak in the Memel region in the latter part of the nineteenth century, so it may be taken for granted that local infections are very rare—indeed Cochrane (*4*), an English authority, remarks, "There is no endemic leprosy in Germany and only eight cases, all foreigners, mostly from Brazil."

Leprosy is endemic in parts of Italy, but cases developing in Rome and vicinity seem to be uncommon since but one example has been found in recent years in which infection probably occurred in that area (*5*).

Available information shows that leprosy which was so prevalent in Norway in the last century has declined so that now it practically has reached the vanishing point.

The communicability of leprosy in the United States has been a subject of much interest and some concern to physicians and health authorities. Better records are available for studying this subject in the city of New York than for any other place in the country, with few exceptions. Approximately half a dozen cases are reported to the health authorities there annually, and always a careful study is made of each one with the view of ascertaining probable contact with leprosy and the place of infection. Although these investigations have been made routinely on a total of at least 100 cases, not one could be discovered that could, beyond reasonable doubt, be attributed to infection acquired in New York, or indeed anywhere else in the northeastern part of the United States.

So far as the records show, but two cases have been discovered in New York which by any impartial interpretation of the evidence might possibly have been infected there. These are as follows:

Case 1.—A young man who had in recent years lived in New York but whose earlier life had been spent in Canada was found to have leprosy. There was no history of association with lepers, either in Canada or in the United States. As the part of Canada in which this young man had lived never has been known to have produced a case of leprosy, the case has tentatively been assigned to New York with a full understanding that the evidence is unsatisfactory.

Case 2.—M. C., male, aged 32, born in New York and lived there nearly all of his life. He was found to have clearly marked nodular leprosy early in 1941. The manifestations were said to have been of 4 months' duration. Just prior to coming to New York where the disease was detected, he had lived in California—4 weeks in San Francisco, and about 3 years in Los Angeles. There was no known contact with leprosy either in California or in New York. The longest possible incubation period, assuming that infection occurred in California, would

be about 3 years—a period not to be given much weight in determining the source of infection. Furthermore, transmission of leprosy is very uncommon in California as will be shown later.

Obviously it is impossible to be certain of the source of infection in either of these interesting cases.

Doubtless the time will come when cases will be found clearly traceable to infection in New York just as it came about that persons infected in Minnesota were discovered, as will appear later. It may be confidently predicted, however, on the basis of many years of observation, that the experience will be the same as that of Minnesota, i. e., the infections occurring in the city of New York will be negligible in number, and always will be far less than are the imported cases—imported from other parts of the United States or from abroad.

To illustrate the probable sources of infection of lepers discovered in New York the following tabulation covers cases that have come to the attention of the city health authorities during a period of approximately 2 years ended April 30, 1941.

Initials of patient	*Place where disease probably was acquired*
D. E	British West Indies.
S. M	Dutch Guiana.
J. W	California.
J. J	Central and South America and Texas
C. S	Chile, Panama, Cuba, Brazil (South)
C. G.	Puerto Rico.
F. G (sailor)	Sicily, Algiers, Russia
L. W	China
W. S	China.
H. B	Hawaii, Philippines
D. M	Hawaii.
F. M	Philippine Islands.
M. C. (case reported above).	California or New York

Less complete data covering a longer period of time, and not including any cases referred to above, are shown in the following list. Probable sources of infection of lepers reported by the New York City Health Department, not included in the preceding table, are shown:

Birthplace	*Number of cases*
British West Indies	13
Virgin Islands	3
Russia	3
China	2
Cuba	2
Philippine Islands	2
Puerto Rico	2
Dutch Guiana	2
Italy	2

Birthplace	Number of cases
Florida	2
Georgia (Savannah)	
Massachusetts (visited or lived in South America)	
Texas	
British Guiana	
Canal Zone	
Colombia, S. A	
Cyprus	
Germany (exposed in Peru, Brazil, and Argentina)	
Greece	
Haiti	
Malta	
Morocco	
Poland	
Santo Domingo	
Sicily	
Spain	1
Turkey	1
West Indies	1

The suggestion has been made that, possibly, persons acquiring the disease in New York do not come to the attention of the health authorities. This criticism appears to lose force when it is recalled that a number of lepers do come to the attention of the authorities annually and that upon investigation they can be traced to infection elsewhere with the exception of the two cases already mentioned. It would seem that cases infected locally would be as likely to be reported as those infected elsewhere.

By way of contrast let us turn our attention to cases of leprosy reported to the health authorities in the Gulf Coast States, especially Louisiana, Texas, and Florida. The lepers from Louisiana (259 cases in the period 1913 to 1937) and from Florida (65 in the period 1911 to 1937) are nearly all infected within those States, while a few contracted the disease in other well known foci. In Texas (159 cases from 1920 to 1937) the situation is a little different. While many persons are infected in the State, a number (at least 26 in the period mentioned) acquire the disease in the Mexican Republic. The figure given here for Texas is believed to be more of an understatement of the true number than that for the other States.

It is rather generally believed that there is a focus of leprosy in the central northwestern States, particularly Minnesota. The experience in Minnesota, the Dakotas, Iowa, and Wisconsin has been most instructive and interesting. During the last half of the nineteenth century there was a large immigration to this area from the Scandinavian countries, especially from Norway where at that time leprosy was rather prevalent. Among the immigrants were a number of persons with leprosy, and some persons who developed the disease soon

after arrival in America. The total number of lepers among the immigrants, including those in whom the disease was in the incubation stage, is uncertain but probably was between 100 and 200. More of the immigrants (and the lepers) settled in Minnesota than in any other State, indeed, probably more than in all other States mentioned. So far as is known, with the single possible exception of a case developing in an American-born person in Wisconsin, none of the States other than Minnesota furnished any indigenous cases. The number of lepers and persons in the incubation stage coming to Minnesota is not known but there is evidence that there were not less than 50 and probably not more than double that number. A rather careful study of the records indicates that the number was at least 72. So far as the available data warrant any opinion, one may say that the health authorities of Minnesota decided they would await developments and they refused to become alarmed over leprosy. Therefore, little or no attempt was made to control the spread of the disease in that State at that time.

Dr. Gronvald, the scientific advisor on leprosy for the Minnesota State Board of Health, a man thoroughly familiar with this disease from his experience abroad, wrote in 1894 in respect to a leper about whom he had been consulted: "Let the man live in peace, impressing on him of course the old precept of cleanliness first and cleanliness last—own bed and bedclothes, own table utensils, and, if possible, own room."

Bracken *(6)*, State health officer of Minnesota, reported in 1898 that among 78 children born to lepers no case of leprosy had developed among the children, nor had any leper infected his companion in wedlock.

. For the first 40 or 50 years after the migration of lepers into the northwestern States, no infections locally acquired were reported; then over a period of 21 years (1895–1916) seven cases developed among American-born persons, chiefly in family contacts of foreign-born lepers; the first appeared in 1895, the last in 1916. It is a question whether any leprosy developed in the second generation of American birth. One case is recorded (1921), that of the daughter of an American-born leprous mother. The evidence with respect to this child is conflicting and there is no agreement as to whether she had leprosy; if she had, recovery was prompt and complete. To sum up the Minnesota experience it may be said that not less than 70 imported lepers gave rise to 7 contact cases and that these 7 gave rise to a doubtful one.

At least 13 lepers of Norwegian origin lived in Iowa between 1863 and 1899 but no case is known in which the disease was acquired in that State. Interest in leprosy in Iowa originated in 1883 when the Swedish health authorities sought to ascertain the status of this disease in the United States by communicating with the State Board

of Health of Iowa and the then National Board of Health at Washington, D. C.

The survey of the central northwestern States reveals that the whole tendency was towards automatic suppression with the result that leprosy has disappeared in that region.

The experience in California has been very similar to that in Minnesota and neighboring States but has attracted less attention than that of Minnesota. The lepers of California have come mainly from Mexico, the islands of the Pacific, and from China. The records of the State department of health show 475 cases of leprosy from 1913 to 1940. Deaths from 1906 to 1940 totaled 90 for the period, as shown by the following table:

Year	Cases	Deaths
1906 [1]		1
1907 [1]	...	4
1908 [1]	...	5
1909 [1]	...	3
1910 [1]	...	2
1911 [1]	...	4
1912 [1]	...	3
1913	11	...
1914	7	3
1915	12	3
1916	13	...
1917	21	6
1918	20	5
1919	23	4
1920	20	4
1921	27	6
1922	25	4
1923	19	8
1924	19	1
1925	24	4
1926	18	1
1927	23	5
1928	19	1
1929	23	2
1930	19	1
1931	19	1
1932	20	2
1933	11	2
1934	14	2
1935	16	...
1936	9	...
1937	13	2
1938	15	...
1939	9	...
1940	6	1
Total	475	90

[1] Morbidity records since 1913 only.

Of the 475 cases shown in this tabulation, not more than 14 probably were infected in the State. It seems clear from the histories in these cases that the disease could not have been acquired elsewhere. This figure, 14, includes two young leprous children of a Japanese leprous mother, discovered in 1941. The mother was reported to have been born in New Zealand and the source of her infection could not be ascertained. Also among the 14 was an American-born adult male, the place of whose infection could not be ascertained, but which probably was central California. Some years after this man's death from leprosy, one of his sons developed the disease. This is the only case with which the author is acquainted in which leprosy appeared in the second generation of a California-born person.

It will be noted that the number of cases and of deaths has declined in recent years. This probably is due to two factors: (1) examination of immigrants and exclusion of lepers and (2) the fact that from 1922 to 1938, inclusive, 165 California lepers have been committed to the United States Leprosarium at Carville, La., where their deaths would be recorded rather than in California. Data were available showing the birthplace of lepers reported in this State from 1920 to 1934. It is recognized that the place of birth is not necessarily the place in which the disease was acquired, but probably in the great majority of cases the two coincide.

Birthplace of lepers found in California

Place of birth	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	Total
Mexico	13	15	12	8	9	16	11	14	12	14	10	11	7	3	10	165
Philippines		2	1	1	1	2	2		3	3	4	4	8	6		37
China	2	2	3	6	2	2	1			2			1	1		22
California					1	2	2	1	1		1	2	1			11
Hawaii				1		1	2	1		1	1	2				9
Spain					2	1			1							4
Japan												1			2	3
Puerto Rico										2					1	3
India		1					1									2
Tahiti								1			1					2
Greece		1											1			2
Ohio				1										1		2
Arizona	1														1	2
Syria							1								1	2
Korea	1															1
Cape Verde Islands		1														1
Portugal		1														1
Kansas			1													1
Alabama			1													1
Russia				1												1
England					1											1
Malta					1											1
Utah									1							1
Texas								1								1
Minnesota								1								1
Florida								1								1
Louisiana									1							1
West Indies													1			1
Montenegro													1			1
Poland															1	1
Hungary															1	1

There is a small area on the South Atlantic Coast where leprosy has occurred; somewhat accurate data are available for Charleston, S. C., only. There are records of deaths in Charleston almost continuously since 1821. Nine deaths from leprosy were reported from 1824–48 (25 years), while in the 25 years ended with 1937 there have been 10 deaths from the disease. The population of Charleston was approximately 30,000 in 1830 while it was approximately 68,000 in 1920. Obviously the tendency is toward a reduction of the number of cases in proportion to the population in this area. So far as the records show, all of the cases in Charleston have been infected locally with the exception of possibly two patients, one born in Scandinavia, and one born in Germany. So far as can be determined at this late date there never was any serious attempt made toward the control of leprosy in Charleston and it seems fair to assume that whatever reduction has occurred in the number of lepers has been due to the operation of natural causes.

The health records of Savannah, Ga., are less satisfactory but there have been three cases recognized in the period 1912–26; so far as one can judge, all of these persons were infected in Savannah or vicinity. The only other case certainly chargeable to Georgia was reported in 1924. The patient was a colored boy, 15 years old, who always had lived in a small community about 30 miles from Savannah. The source of his infection was not established, but a layman's description of a condition from which the patient's grandmother had died many years before was suggestive of leprosy.

When infections occur in Minnesota, California, or in the Gulf coast area, often direct contact with a leper can be established, or it can reasonably be assumed that there has been an unrecognized contact.

There is another small group of cases that is perhaps the most puzzling for the epidemiologist. These develop in areas in which the disease is not endemic and even the most searching investigation that has been practicable has failed to show any probable source of the infection. The author is acquainted with one case that must have been infected either in Maryland or Virginia, one in Missouri or Illinois, one in Pennsylvania, and two either in Illinois or Kansas. The latter cases deserve a little further explanation. A young woman was found to be suffering from leprosy while living in Chicago after having spent the early part of her life in Kansas. Her parents were from Virginia. A year or more after the daughter's infection was recognized her mother, who had been with the daughter, also developed leprosy. The most careful investigation of this case by the writer and others has failed to reveal a possible source of infection of the daughter, but the mother presumably was infected from her daughter.

SUMMARY

Leprosy has been introduced into different areas of the United States with very different consequences. In Louisiana, Florida, and Texas the presence of imported cases has resulted in the establishment of foci in which the disease shows a strong tendency to perpetuate itself, while in the central northwestern States and in California the reverse prevails and the disease has shown little tendency to become established. Elsewhere in the United States leprosy transmission occurs so rarely that it is negligible from the public health point of view.

The data presented refer to experiences with leprosy up to the present time. But in an age in which great changes, both social and economic, are occurring, no one can predict what unexpected influence these may have on the occurrence of leprosy as well as other diseases.

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MARINE AMBULANCE SERVICE AT MIAMI, FLA.

Medical officers in the United States Public Health Service are charged with the duty of furnishing medical advice by radio to ships at sea. Certain radio stations on the Atlantic, Pacific, Gulf, and Great Lakes coasts, as well as in Hawaii, have been designated for convenience in radio communication.

The Public Health Service at Miami has received many requests for medical advice from ships that pass approximately 2 miles off shore. Radio consultations are not always satisfactory, and frequently the ship's captain requests that a doctor be sent to determine whether the patient could be treated on shipboard or should be removed to a hospital on shore.

On August 15, 1939, Surgeon General Thomas Parran inaugurated a marine ambulance service by authorizing the use of a quarantine vessel to make contact with ships passing off Miami and furnished medical supplies and equipment. Among items of equipment used is a specially constructed stretcher designed so that the patient being transferred from a large vessel to the small quarantine boat could be securely fastened within and which would safely float the patient if he should be dropped during the transfer.

A total of 113 marine ambulance runs have been made from Miami to the adjacent sea lane. Twenty-four seamen were found in such condition that it was feasible to furnish treatment and permit the men to continue with their ships. The condition of 89 seamen warranted immediate hospitalization. The delivery of these men to the hospital was expedited by sending a wireless request from the vessel to have an ambulance waiting at the dock. Delay to the vessel is minimized as the transfer of a patient is usually accomplished while his vessel proceeds on her course at reduced speed.

The patients removed included serious accident cases due to falls, crushing injuries, and extensive burns. The more common surgical emergencies such as appendicitis, gall bladder and kidney conditions, and intestinal obstruction have been encountered. Such medical emergencies as pneumonia and cardiac and mental diseases have been given prompt attention through the operation of the marine ambulance service.

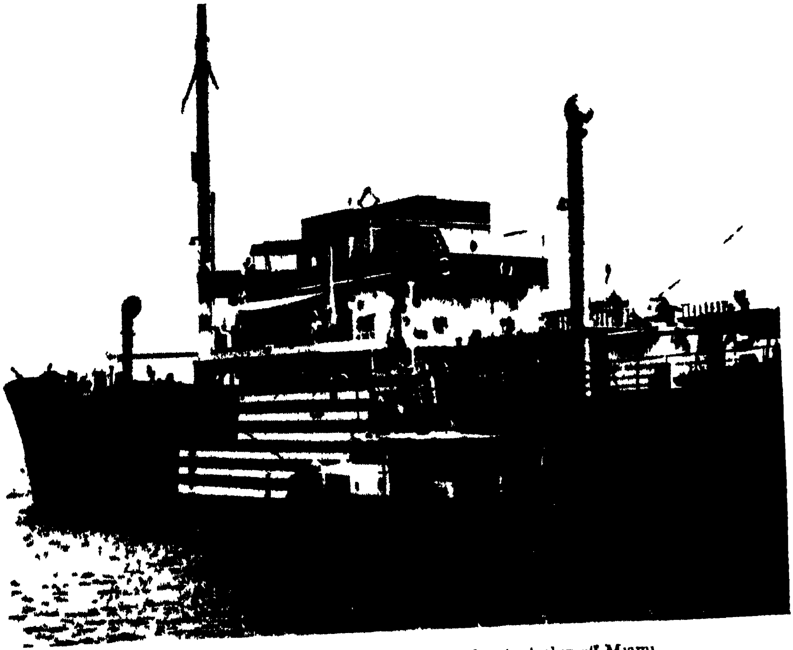

FIGURE 1 Marine ambulance boat alongside a tank ship off Miami

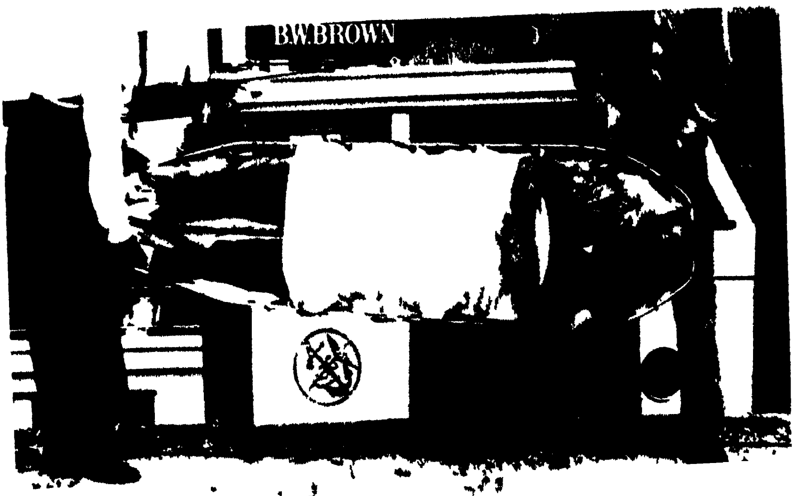

FIGURE 2—Illustrating the ease of handling a patient when secured in the stretcher With the canvas flap laced over the arms and up to the chin, a mentally upset patient can be transported without difficulty

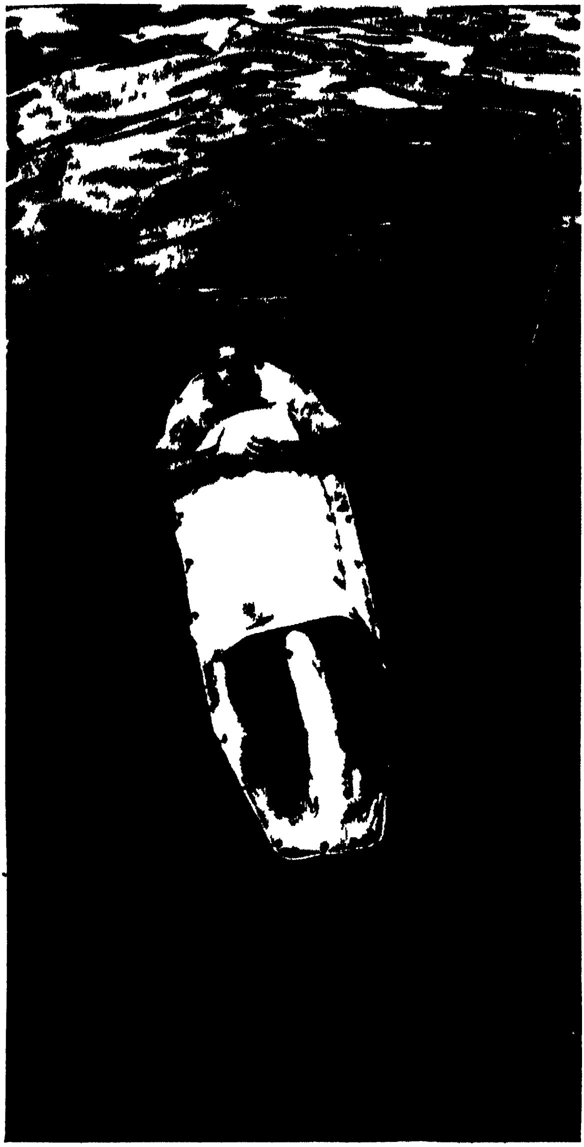

FIGURE 3. The stretcher, fitted with a kapok-filled pad, to insure floating in the event of accident in transferring from ship to ship

LOCATION AND MOVEMENT OF PHYSICIANS, 1923 AND 1938—EFFECT OF LOCAL FACTORS UPON LOCATION[1]

By JOSEPH W. MOUNTIN, *Assistant Surgeon General*, ELLIOTT H. PENNELL, *Statistician*, and VIRGINIA NICOLAY, *United States Public Health Service*

In earlier articles [2,3] the authors of this series expressed quantitatively the uneven distribution of physicians. More specifically, there was revealed a paucity of provisions for professional services in States where the per capita income was low and where a large fraction of the population resided in rural areas. This situation was more serious in 1938 than in 1923, but seemed to be mitigated to a slight extent in those depressed areas which were favored by the presence of hospitals—especially those offering opportunities for intern training.

With the large and rapidly accelerating withdrawal of physicians from private practice to meet the exigencies caused by the war effort, data depicting the distribution of physicians assume particular significance in defining areas in which civilian health and morale would be least affected by further drafts. It may also be anticipated that the factors which determined the location and subsequent migration of physicians after the first World War will be operative in the period of readjustment following the current crisis unless some efforts are made to understand and direct the forces which have precipitated these distributional trends.

The large reservoir of information abstracted from data published in medical directories [4] makes possible analyses beyond those previously presented. To facilitate the tabulation of this material for local areas, county summary totals were prepared from the information concerning individual physicians and from other sources. These totals provide data which comprise the census population counts for counties in 1920, 1930, and 1940, the number of physicians located therein in 1923 and 1938, the distribution of physicians in 1923 and 1938 by 5-year age intervals,[5] the number of hospital beds in 1940,[6] and the total effective buying income in 1940.[7] Aggregate totals were then assembled for groups of counties classified on the basis of per capita income, metropolitan character, largest urban place and number of hospital beds in 1940, population trends from 1920 to 1930

[1] Assistance in the preparation of these materials was furnished by the personnel of Work Projects Administration Official Project No. 65-2-23-356.

[2] Mountin, Joseph W., Pennell, Elliott H., and Nicolay, Virginia: Location and movement of physicians, 1923 and 1938—General observations. Pub. Health Rep., 57: 1363-1375 (1942).

[3] Mountin, Joseph W., Pennell, Elliott H., and Nicolay, Virginia: Location and movement of physicians, 1923 and 1938—Turnover as a factor affecting State totals. Pub. Health Rep., 57: 1752-1761 (1942).

[4] American Medical Directory, eighth, ninth, tenth, eleventh, twelfth, thirteenth, fourteenth, and fifteenth editions, 1923, 1925, 1927, 1929, 1931, 1934, 1936, and 1938. American Medical Association, Chicago.

[5] Physician totals were tabulated from information abstracted for individual physicians.

[6] Hospitals and other institutional facilities and services: 1939. U. S. Department of Commerce, Vital Statistics—Special Reports, Vol. 13.

[7] Sales management survey of buying power. Sales Management, Vol. 48, No. 8 April 10, 1941.

and from 1930 to 1940, and the number of physicians at the mid-period (1931).

It is recognized that scarcely any particular class of local political subdivision may be considered as representing a self-sufficient area in the provision of service such as medical care. On the other hand, a county usually encompasses a sufficiently large population group to permit the computation of reliable indices, and at the same time to provide community data which are essentially local in scope. Furthermore, individual peculiarities of aberrant counties tend to be merged in aggregate figures of the numerous units comprising broad categories. Tabulations from the county data reveal in dramatic fashion the

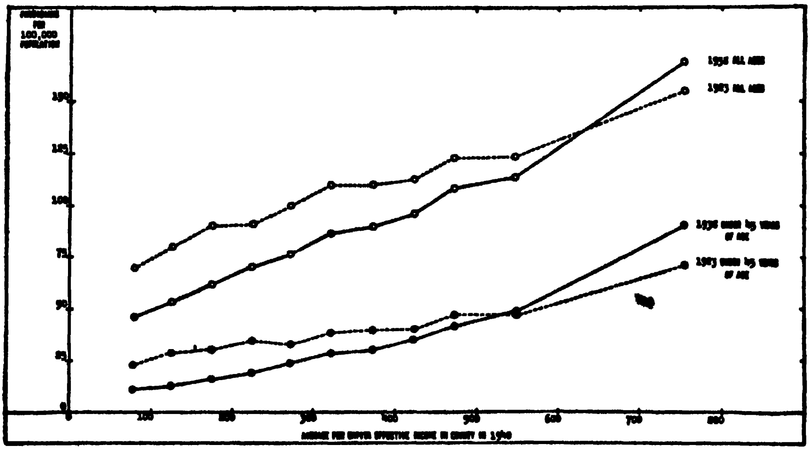

FIGURE 1.—Physician-population ratios in counties with different per capita incomes, 1938 and 1923

influence of factors such as wealth, urban character, and medical facilities upon the ratio of physicians to population in local areas, and the trend in these ratios during the study period.

Among the several factors investigated, community wealth was found to be of paramount importance in determining the availability of physicians. The measure of wealth for classifying counties was obtained by dividing the 1940 effective buying income[8] in the county by the population. In 1938 the combined population in counties of different income classifications (table 1) varied from 1,244,000 in the group of poor counties with average per capita incomes of less than $100 to nearly 65,000,000 in counties where the per capita incomes averaged $600 or more. The number of physicians varied from less than 600 in the former to nearly 111,000 in the latter group of counties. When related to population (fig. 1) there was a marked progression

[8] Effective buying income, as presented in "Sales Management Survey of Buying Income (7)," is based upon money income from all sources plus an estimated nonmoney income of farmers and small-town residents within a State. The per capita figures referred to throughout this report have been obtained by dividing the county income totals by the 1940 U. S. Census population count.

from 46 physicians per 100,000 population in the poorest counties to 171 in counties with average incomes of $600 or more; physicians under 45 years of age represented 11 per 100,000 in the former and 86 per 100,000 in the latter group. Throughout the range of income, provisions in medical personnel increased in conformity with elevation of income. In counties with the highest per capita incomes the physician-population ratio was nearly four times as great as in the poorest counties; this ratio for physicians under 45 years of age was eight times as great. More than one-half of all physicians in the wealthy counties were under 45 years of age, but less than one-fourth were in this category in the poorest counties.

Comparable data for 1923 reveal a similar pattern with the exception that the contrast is less pronounced. The counties classified as most wealthy realized twice as many physicians per unit of population as did the poorest group of counties, while physicians under 45 years of age per unit of population were only slightly more than three times as numerous in the wealthy as in the poor counties. Thus it is apparent that the growing tendency for physicians to select wealthy and populous counties for the practice of medicine becomes more pronounced with each succeeding year.

TABLE 1.—*Distribution of population, total physicians, and physicians under 45 years of age in the continental United States in 1938 and in 1923 by income class of county*

Per capita income class of county	Average per capita effective buying income 1940	Estimated population (add 000)		Total physicians				Physicians under 45 years of age			
				Number		Per 100,000 population		Number		Per 100,000 population	
		1938	1923	1938	1923	1938	1923	1938	1923	1938	1923
All counties	563.3	130,104	111,526	169,594	146,344	130.4	131 2	76,763	61,101	59.0	54.8
Less than $100	80 1	1,244	1,149	567	797	45 6	69 4	135	261	10 9	22.7
$100–$149	126 9	3,960	3,735	2,127	2,984	53.7	79.9	487	1,048	12 3	28.1
$150–$199	175 8	6,216	5,769	3,826	5,230	61 6	90.7	968	1,739	15.6	30.1
$200 $249	225 7	6,447	6,067	4,525	5,611	70.2	92.5	1,238	2,080	19.2	34 3
$250–$299	273.9	5,584	5,081	4,266	5,116	76.4	100.7	1,338	1,673	24.0	32.9
$300–$349	323.8	5,408	5,080	4,697	5,658	86.9	111.4	1,545	1,975	28.6	38.9
$350–$399	374 6	6,080	5,724	5,511	6,367	90 6	111.2	1,851	2,294	30.4	40.1
$400–$449	426 0	6,078	5,563	5,902	6,361	97 1	114.3	2,125	2,258	35 0	40 6
$450–$499	474 9	7,677	6,695	8,395	8,337	109.4	124.5	3,225	3,199	42.0	47.8
$500–$599	552 1	16,667	13,759	19,187	17,144	115 1	124 6	8,089	6,497	48 5	47 2
$600 or more	758 5	64,743	52,904	110,591	82,739	170.8	156.4	55,762	38,077	86.1	72.0

As a matter of course, to maintain a fixed physician-population ratio over a period of time, the variation in the population counts must be balanced perforce by a corresponding proportionate variation in the number of physicians. Increased ratios may result in areas where the proportionate increase in physicians is greater than that for the population as a whole, or when decreased physician totals are associated with a population decline of greater proportions. The question naturally arises as to the degree of parity which has obtained between

population trends and physician migration trends during the period under study.

In the aggregate, the physician-population ratios for counties showing population increases in both intercensal periods 1920 to 1930 and 1930 to 1940 were high at the initial and terminal years of the study period and a moderate increase appeared during the interval. This was true of both total physicians and new registrants. On the other hand, decreased population totals in the intercensal periods were reflected in low and sharply declining ratios. In counties showing population gains in 1920 to 1930 followed by declines in the later decade, the ratios presented essentially the same picture as did those for counties with consistently increasing population totals throughout, whereas ratios for counties showing early population declines followed by increases in the last intercensal period pursued the pattern established by counties with consistently declining populations.

Further classification on the basis of income indicates that the high and increasing ratios in counties with expanding populations as revealed in the consolidated figures reflect the dominant influence of wealthy counties. In counties with average per capita incomes of less than $300, the ratios were low, regardless of population trend, and showed pronounced declines over the 15-year period covered by the study. At this income level, the ratios were slightly more favorable in counties where population declined in both intercensal periods than in counties where there was a consistently increasing population trend. In contrast, the ratios were relatively high in counties with average per capita incomes of $600 or more. Consistent population increase in counties of this classification indicated ratios markedly in excess of those for counties with population declines. Furthermore, counties in the former group realized considerable expansion in ratios from 1923 to 1938. Where population trends were consistently downward in wealthy counties, the ratios reached parity with those for all counties except wealthy ones with population increases, and these ratios were maintained at essentially the same level to the end of the study period.

These disclosures suggest that consistent population increase in areas reflects factors which serve to attract physicians, but only when the income in these areas is high. In counties of this class, the ratios both for total physicians and for those under 45 years of age were large, and the recruitment of physicians exceeded even the population increases so that expanded ratios occurred. Declining population totals in wealthy areas resulted in diminishing physician totals in almost the same degree so that the ratios varied only slightly during the study interval. In poorer counties, on the other hand, the provisions for care at a given time were not greatly affected by the population trends, but regardless of population trends the ratios declined in a consistent manner.

The lack of facilities for professional care of ill persons in counties may simply mean that those in nearby areas serve satisfactorily the residents of a county. However, generous facilities within a county may have developed because patients in large numbers are attracted thereto from adjoining or even from distant areas. The definition of counties, or groups of counties which represent both facilities and the population served thereby, is not strictly possible inasmuch as service areas are not always conformable to the boundaries of established political units. Exception may occur where special services are provided at public expense, and where residence within the areas has been established as a prerequisite in eligibility for care. To obviate at least in part the above difficulties, a special analysis has been prepared whereby counties are described in terms of their location with respect to metropolitan areas as defined by the United States Census Bureau in 1940. The classification of the Census Bureau [9] brings together people of urban centers of 50,000 or more inhabitants plus those residing in densely inhabited adjacent areas as single population units. For the purpose of this study this definition of metropolitan area has been extended to include all parts of the affected counties; all other counties are classified as nonmetropolitan. This classification of counties groups all populous and relatively wealthy urban counties plus a considerable number of contiguous counties which may be small either from the standpoint of area or population; the group of nonmetropolitan counties includes those essentially rural in character. The chief distinction between the two groups of counties is that residents of the former live within or at locations more or less accessible to large population centers, whereas residents of nonmetropolitan counties are removed by one or more counties from such concentrations of population.

The data in figure 2 reveal increasingly unequal provisions for physicians' services in the two types of counties during the 15-year period covered in the study. In 1923, there were 152 physicians per 100,000 population in the metropolitan counties as contrasted with 110 in the nonmetropolitan group. By 1938 the ratios in these two identical groups of counties had increased to 164 where the classification was metropolitan and had declined to 92 for the more rural group. It is thus apparent that the disparity in facilities for care, while large in 1923, was greatly expanded by the end of the period.

Wealth played an important part in the determination of facilities in both metropolitan and nonmetropolitan areas. In 1923 the physician-population ratio in the wealthiest metropolitan counties was more than twice as great as in the poorest group whereas it was only about 50 percent greater in nonmetropolitan counties. By

[9] Population and housing units in the metropolitan districts of the United States: 1940. Series PH-1: Summary. U. S. Department of Commerce, Bureau of the Census.

1938 the ratios had increased from 159 to 176 in wealthy metropolitan counties and had declined from 74 to 54 in the poor counties. Wealthy nonmetropolitan counties, on the other hand, nearly main-

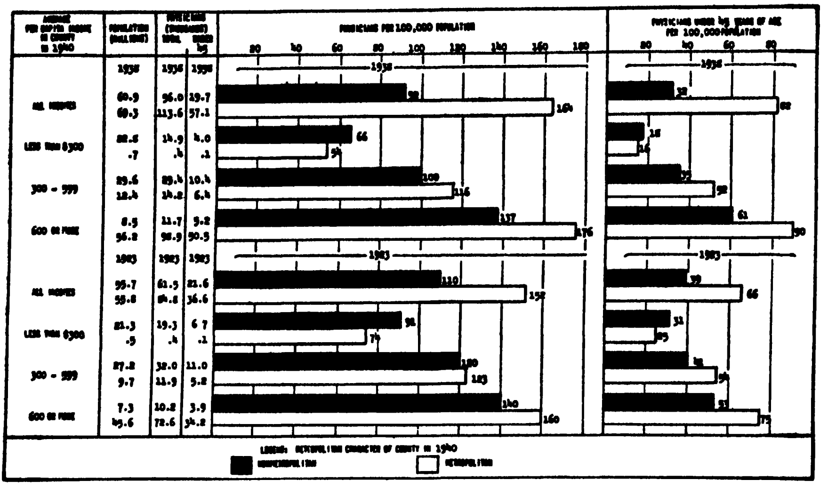

FIGURE 2.—Physician-population ratios in counties with different per capita incomes and of different metropolitan character, 1938 and 1923.

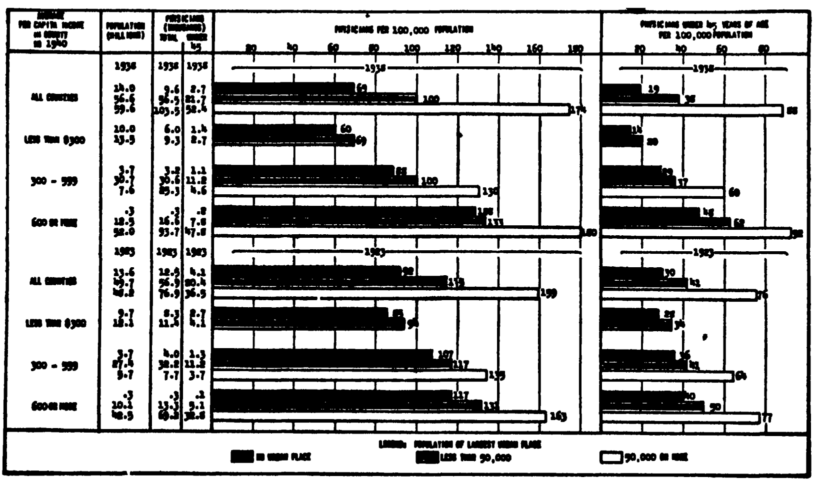

FIGURE 3.—Physician-population ratios in counties with different per capita incomes and of different urban character, 1938 and 1923.

tained the same provisions for care throughout the period as is indicated by the slight decline from 140 in 1923 to 137 in 1938. Poor counties in this group, while showing ratios which declined from 91 to 66, were able to maintain their facilities to about the same extent as did poor metropolitan counties. It should be noted that low rates in poor metropolitan counties do not present the same problem

as in the other group because these counties are adjacent to wealthy counties where large numbers of physicians reside.

A high degree of association between urban character of a county and the number of physicians located therein per unit of population is revealed in figure 3. In 1923 there were 92 physicians per 100,000 persons residing in strictly rural counties (no incorporated place of 2,500 or more inhabitants located therein). The presence of urban places of less than 50,000 inhabitants in counties was reflected by an average ratio of 115, and counties with cities of 50,000 or more people realized 159 physicians per 100,000 population. The corresponding ratios for 1938 were 69, 100, and 174. Only in the most urban counties was there evidence of more generous provisions for care in 1938 than in 1923.

Variations in urban character of counties resulted in important differences in the number of physicians at the three income levels studied. In counties reporting average per capita incomes of less than $300, the ratio in 1923 for strictly rural counties was 85; poor counties having one or more urban places of less than 50,000 inhabitants realized a ratio of 94. No counties with cities of 50,000 or more fell into this income group. The ratio for the two classes of poor counties showed large declines over the period. Essentially the same tendencies were displayed by counties with average per capita incomes from $300 to $599 except that the ratios were higher and the declines were less pronounced over the study period. Among the wealthiest counties, however, the ratios actually increased during the study period. For wealthy counties with cities of 50,000 or more inhabitants the ratio increased from 163 in 1923 to 180 in 1938, whereas the ratio in wealthy rural counties changed from 117 to 128. The ratio for young physicians (under 45 years of age) followed the same pattern as that established by all physicians.

In modern medical practice the hospital is an invaluable adjunct. Such an institution affords means for the accurate diagnosis and proper treatment of illness, and in many cases is essential for the care and recovery of patients. Absence of hospital facilities in a county may not always indicate a lack of accommodations accessible to those needing care, because one or more hospitals may exist in nearby areas. Nevertheless, relatively large numbers of hospital beds in counties are reflected in generous physician-population ratios. For the country as a whole there were in 1938 only 67 physicians per 100,000 population in counties without general or allied special hospitals as contrasted with 157 for counties in which there were 250 beds or more.

Figure 4 reveals a close association between hospital facilities and physician-population ratios. In wealthy counties with large numbers of hospital beds (250 or more) the ratios for both 1923 and 1938 exceeded by approximately 50 percent those for the corresponding group

of counties without hospitals. In counties of the lowest income classification such differences persisted but were not as great as in wealthy counties. This would indicate that, regardless of the income class of the county, the presence of large numbers of hospital beds reflected more attractive locations for physicians than did the limitation or absence of these facilities. This was especially true of physicians under 45 years of age. In all income classes the ratios of young physicians to population were twice as great where hospital beds were numerous as in counties without such facilities. The important contribution made by accessory facilities for medical care represented by large numbers of hospital beds upon the size of physician-population

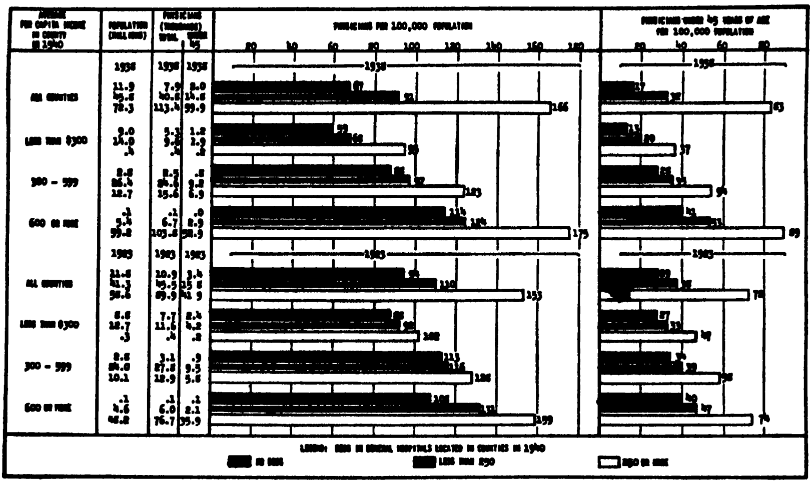

FIGURE 4.—Physician-population ratios in counties with different per capita incomes and with different facilities in general hospitals, 1938 and 1923.

ratios suggests that such facilities alone afford attraction for establishing medical practice apart from other factors such as wealth, population expansion, and urban character of counties.

Another important adjunct to the practice of modern medicine is the accessibility of professional associates for consultation and exchange of professional ideas. The opportunities for consultation and collaboration in the care of obscure conditions become greater as the number of physicians in an area is increased. Where the provisions for medical care in a county are limited to a small number of physicians the opportunities for interchange of professional ideas are fewer than in counties where the number of physicians is large. Analysis reveals that in counties where physicians in 1931 numbered less than 5 per county, there were only 69 physicians per 100,000 population in 1923 and the ratio had declined by 1938 to 57. Where there were 100 or more physicians per county in 1931 the ratio was 156 in 1923 and had

been elevated to 170 in 1938. At each income level large numbers of physicians were reflected in ratios markedly in excess of those for counties with small numbers of physicians. In 1938 the ratio of 44 physicians per 100,000 population in counties with few physicians and with average per capita incomes below $300 was only one-fourth as great as the 178 in wealthy counties with large physician totals. The number of physicians under 45 years of age showed even greater differences, the ratios varying from 12 in the poorest counties with few physicians to 91 in wealthy counties with 100 physicians or more.

SUMMARY

The data presented reveal much greater concentrations of physicians in some counties than in others. Throughout the comparison, wealth is a dominant factor in the maintenance of high physician-population ratios. Where wealth is high the ratios in 1923 were elevated and tended to remain fixed or even to expand by the termination of the 15-year period. In poor counties, on the other hand, the ratios in the initial year were low, and as a rule were seriously reduced by 1938. This phenomenon was revealed in an even more dramatic fashion for physicians under 45 years of age.

While metropolitan and urban character of counties, facilities as revealed in a count of total beds in general hospitals, and physicians in a county are closely allied with wealth, these factors in isolation also tend to induce larger physician-population ratios at all income levels.

Where income is high and the classification on the basis of other factors used to describe features making counties attractive to physicians is also high, the physician-population ratios are several times as great as in those counties falling lowest on the comparison scales. The number of physicians under 45 years of age per 100,000 population in these most favored classifications generally exceed the ratios based upon total physicians in the poorest counties. It is apparent that the great reservoir of physicians is in the large urban centers. If the ratio of physicians to population in the nonmetropolitan counties were taken as a base, one would find a marked excess of physicians in the larger urban centers and the counties immediately adjacent. Throughout the study period, which embraces a complete economic cycle, there has been a more pronounced tendency for physicians than for the general population to concentrate in urban areas.

DEATHS DURING WEEK ENDED DECEMBER 5, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Dec. 5, 1942	Corresponding week 1941
Data from 87 large cities of the United States:		
Total deaths	9, 628	8, 487
Average for 3 prior years	8, 513	-------
Total deaths, first 48 weeks of year	401, 720	398, 807
Deaths per 1,000 population, first 48 weeks of year, annual rate	11. 7	11. 6
Deaths under 1 year of age	675	528
Average for 3 prior years	506	-------
Deaths under 1 year of age, first 48 weeks of year	27, 671	25, 201
Data from industrial insurance companies:		
Policies in force	65, 292, 593	64, 696, 204
Number of death claims	12, 811	11, 289
Death claims per 1,000 policies in force, annual rate	10. 2	9. 1
Death claims per 1,000 policies, first 48 weeks of year, annual rate	9. 1	9. 4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED DECEMBER 12, 1942

Summary

The number of reported cases of influenza increased from 1,928 for the preceding week to 2,604 for the current week. The 5-year median (1937–41) is 2,995 cases. The current incidence, as well as the cumulative total to date, is below that for any previous year since 1938. While the number of reported cases for the country as a whole is below the median expectancy, the disease has been unusually prevalent in a few States in the South Atlantic and West South Central areas. Of the current total, Texas reported 732 cases, South Carolina 517, Virginia 371, Oklahoma 185, and Georgia 116—a total of 1,921 cases, or 74 percent, in these 5 States.

The incidence of meningococcic meningitis continues above the median expectancy, especially in some of the eastern States and the Pacific Coast area. The number of cases increased from 88 last week to 103 for the current week. The following named States reported the largest numbers: New York 11, Pennsylvania, Virginia, and Oregon 10 each, and Maine, Massachusetts, and California 6 each. No other State reported more than 5 cases. A total of 3,387 cases has been reported to date, which is the largest number reported for this period since 1937, when 5,146 cases had been reported.

The incidence of poliomyelitis declined from 79 to 66 cases, of which 22 occurred in Texas, 13 in California, and 5 in Pennsylvania. No other State reported more than 3 cases.

A total of 90 cases of endemic typhus fever was reported. To date, 3,509 cases have been reported—a larger number than for any previous entire year (2,998 in 1939 and 2,787 in 1941).

The death rate for the current week in 88 large cities in the United States is 13.0 per 1,000 population, as compared with 12.8 last week (excluding the Boston fire mortality), and a 3-year (1939–41) average of 11.9. The lack of accurate current urban population estimates and possible changes in the age distribution of these populations are as yet undetermined factors in these current death rates.

Telegraphic morbidity reports from State health officers for the week ended December 12, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41	Week ended—		Median 1937–41
	Dec. 12, 1942	Dec. 13, 1941		Dec. 12, 1942	Dec. 13, 1941		Dec. 12, 1942	Dec. 13, 1941		Dec. 12, 1942	Dec. 13, 1941	
NEW ENG.												
Maine	1	0	1	-------	1	1	7	263	42	6	0	0
New Hampshire	1	2	1	-------	1	-------	58	4	4	0	0	0
Vermont	0	3	0	-------	-------	-------	109	0	21	0	0	0
Massachusetts	2	7	3	-------	-------	-------	539	143	192	6	1	2
Rhode Island	0	4	0	1	-------	-------	20	19	2	3	0	0
Connecticut	0	0	1	2	5	5	235	74	46	4	2	1
MID. ATL.												
New York	22	20	20	[1] 16	[1] 8	[1] 13	430	214	509	11	2	2
New Jersey	3	6	12	10	13	9	25	17	17	5	1	1
Pennsylvania	11	8	29	5	-------	-------	747	723	723	10	3	3
E. NO. CEN.												
Ohio	11	20	44	17	13	14	36	53	53	3	0	1
Indiana	4	3	20	7	12	12	38	33	14	0	1	1
Illinois	10	41	41	9	5	8	69	40	40	3	2	1
Michigan [2]	7	6	15	2	7	6	38	86	238	0	2	2
Wisconsin	1	0	1	34	34	34	140	129	129	2	1	0
W. NO. CEN.												
Minnesota	5	2	2	1	3	2	5	66	43	0	0	0
Iowa	4	0	3	-------	-------	3	40	44	44	0	1	0
Missouri	5	11	14	1	3	21	6	6	6	1	1	1
North Dakota	1	1	2	1	9	9	0	60	17	0	1	0
South Dakota	0	2	2	-------	-------	-------	55	3	3	1	0	0
Nebraska	4	2	2	21	-------	-------	83	4	4	0	0	0
Kansas	0	2	4	18	48	11	21	97	59	0	3	1
SO. ATL.												
Delaware	0	1	1	-------	-------	-------	1	3	3	0	0	0
Maryland [2]	2	9	9	8	9	12	4	115	14	4	1	1
Dist. of Col	2	0	2	7	1	2	3	2	1	0	0	0
Virginia	21	36	36	371	236	176	17	94	84	10	1	1
West Virginia	6	8	16	20	11	16	2	128	15	2	3	2
North Carolina	18	44	44	2	8	8	2	412	288	1	0	1
South Carolina	15	5	11	517	376	377	3	34	10	0	0	0
Georgia	5	22	14	116	80	99	3	57	8	1	1	0
Florida	7	14	12	1	11	9	0	3	3	2	1	0
E. SO. CEN.												
Kentucky	8	5	17	3	13	15	22	13	13	0	3	3
Tennessee	8	10	19	40	54	53	7	52	28	0	1	2
Alabama	12	23	23	80	98	124	2	41	35	3	0	1
Mississippi [2]	7	8	12	-------	-------	-------	-------	-------	-------	0	2	0
W. SO. CEN.												
Arkansas	15	24	18	87	150	116	22	50	23	0	0	0
Louisiana	7	4	11	13	1	12	3	4	1	0	1	1
Oklahoma	9	20	24	185	87	113	10	37	4	1	0	1
Texas	42	69	46	732	1,423	443	13	236	43	2	3	3
MOUNTAIN												
Montana	0	1	1	-------	12	12	95	28	19	1	0	0
Idaho	4	0	0	-------	-------	5	8	11	13	0	0	0
Wyoming	0	0	0	50	4	4	10	0	1	0	1	0
Colorado	10	14	11	46	25	25	12	244	44	2	0	0
New Mexico	2	0	4	-------	4	1	2	34	34	0	1	0
Arizona	1	8	8	110	110	110	4	22	3	0	0	0
Utah [2]	1	0	1	-------	9	28	658	45	45	1	0	0
Nevada	0	2	-------	-------	-------	-------	11	0	-------	0	0	-------
PACIFIC												
Washington	5	0	8	-------	12	-------	383	7	15	2	1	1
Oregon	9	3	1	16	15	23	221	68	20	10	0	0
California	23	16	20	55	84	52	66	607	134	6	2	1
Total	331	486	707	2,604	2,995	2,995	4,285	4,425	4,425	103	43	36
49 weeks	14,643	15,844	22,471	101,023	514,873	221,737	491,288	852,030	366,393	3,387	1,927	1,927

See footnotes at end of table

Telegraphic morbidity reports from State health officers for the week ended December 12, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis: Week ended— Dec. 12, 1942	Poliomyelitis: Week ended— Dec. 13, 1941	Poliomyelitis: Median 1937–41	Scarlet fever: Week ended— Dec. 12, 1942	Scarlet fever: Week ended— Dec. 13, 1941	Scarlet fever: Median 1937–41	Smallpox: Week ended— Dec. 12, 1942	Smallpox: Week ended— Dec. 13, 1941	Smallpox: Median 1937–41	Typhoid and paratyphoid fever: Week ended— Dec. 12, 1942	Typhoid and paratyphoid fever: Week ended— Dec. 13, 1941	Typhoid and paratyphoid fever: Median 1937–41
NEW ENG.												
Maine	1	0	0	25	11	11	0	0	0	1	0	0
New Hampshire	0	1	0	9	13	10	0	0	0	1	0	0
Vermont	0	0	0	5	0	6	0	0	0	0	0	0
Massachusetts	0	1	0	293	274	109	0	0	0	2	3	3
Rhode Island	0	0	0	6	12	11	0	0	0	0	0	0
Connecticut	0	4	0	37	16	44	0	0	0	0	1	0
MID. ATL.												
New York	3	8	2	278	324	302	0	0	0	6	7	6
New Jersey	0	2	1	59	124	122	0	0	0	2	0	3
Pennsylvania	5	3	2	225	226	260	0	0	0	0	7	7
E. NO. CEN.												
Ohio	2	2	2	330	214	338	0	0	1	5	7	1
Indiana	1	3	1	55	87	138	6	0	3	0	4	3
Illinois	0	5	2	161	207	324	1	0	1	2	3	3
Michigan [2]	3	0	1	111	203	285	0	1	1	1	1	1
Wisconsin	1	0	2	178	147	149	1	1	6	1	1	1
W. NO. CEN.												
Minnesota	0	2	2	88	92	105	0	0	29	2	0	0
Iowa	2	0	1	68	55	62	0	2	10	0	1	1
Missouri	0	1	1	66	59	94	0	0	5	8	1	5
North Dakota	0	1	0	5	11	25	0	0	0	0	0	0
South Dakota	0	0	0	33	33	18	0	0	0	0	0	0
Nebraska	0	0	0	18	27	27	2	0	0	0	0	1
Kansas	3	1	1	67	70	128	0	0	0	0	1	1
SO. ATL.												
Delaware	0	1	0	5	23	12	0	0	0	1	0	0
Maryland [2]	1	0	0	54	47	51	0	0	0	2	13	5
Dist. of Col.	0	0	0	14	9	9	0	0	0	0	2	1
Virginia	0	1	1	45	65	65	0	0	0	0	11	4
West Virginia	0	0	0	47	48	52	0	0	0	1	1	5
North Carolina	0	4	1	81	78	78	0	0	0	2	4	4
South Carolina	1	1	1	21	12	12	0	0	0	0	1	1
Georgia	0	0	1	34	44	38	0	0	0	4	0	3
Florida	0	0	0	7	7	7	0	0	1	0	2	2
E. SO. CEN.												
Kentucky	0	1	1	89	77	77	0	1	0	2	1	3
Tennessee	1	5	1	74	60	60	0	0	0	8	0	3
Alabama	0	1	0	19	41	33	0	0	0	0	1	1
Mississippi [2]	0	1	2	20	16	13	1	0	0	0	1	0
W. SO. CEN.												
Arkansas	3	1	1	6	5	16	0	0	2	3	5	3
Louisiana	0	0	0	8	7	8	0	1	0	3	3	5
Oklahoma	0	1	1	26	27	27	0	2	4	1	3	7
Texas	22	1	1	39	54	63	1	0	2	10	4	11
MOUNTAIN												
Montana	0	0	0	10	24	24	0	0	1	0	0	0
Idaho	0	0	0	1	7	15	1	0	1	0	1	1
Wyoming	0	0	0	3	5	8	0	0	0	0	1	1
Colorado	2	0	0	47	26	31	0	0	22	2	1	2
New Mexico	0	0	1	9	8	16	0	0	0	2	1	3
Arizona	1	1	0	2	9	5	0	1	1	3	0	1
Utah [2]	1	0	1	53	13	18	0	0	0	0	0	0
Nevada	0	0	----	----	10	----	0	0	----	0	0	----
PACIFIC												
Washington	0	3	1	23	37	37	0	0	0	0	0	0
Oregon	0	0	1	19	5	31	0	0	2	0	1	1
California	13	2	3	144	131	191	0	0	2	4	10	6
Total	66	58	58	2,967	3,100	3,741	13	9	119	79	105	143
49 weeks	4,047	3,957	3,957	118,838	119,173	151,214	750	1,295	9,280	6,532	8,128	12,416

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended December 12, 1942—Continued

Division and State	Whooping cough, Week ended— Dec. 12, 1942	Whooping cough, Week ended— Dec. 13, 1941	Week ended Dec. 12, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	124	45	0	0	0	0	0	0	0	0	0
New Hampshire	8	14	0	0	0	0	0	0	0	0	0
Vermont	51	8	0	0	0	0	0	0	0	0	0
Massachusetts	305	199	0	0	2	0	0	0	0	0	0
Rhode Island	48	34	0	0	0	0	0	0	0	0	0
Connecticut	84	44	0	0	1	0	0	0	0	0	0
MID. ATL.											
New York	450	640	0	0	9	0	0	0	0	0	0
New Jersey	212	261	0	0	0	0	0	0	0	0	0
Pennsylvania	347	216	1	0	0	0	1	0	0	0	0
E. NO. CEN.											
Ohio	152	223	0	0	0	0	0	0	0	1	0
Indiana	16	19	0	0	0	0	0	0	0	1	0
Illinois	176	225	0	0	0	0	0	0	0	5	0
Michigan [2]	321	352	0	0	9	0	0	0	0	1	0
Wisconsin	216	273	0	0	0	0	0	0	0	4	0
W. NO. CEN.											
Minnesota	42	27	0	0	0	0	0	0	0	0	0
Iowa	33	16	0	1	0	0	0	0	0	0	0
Missouri	8	20	0	0	0	1	0	0	0	0	0
North Dakota	20	13	0	0	0	0	0	0	0	0	0
South Dakota	2	2	0	0	0	0	0	0	0	0	0
Nebraska	1	3	0	0	0	0	0	0	0	0	0
Kansas	27	33	0	0	0	0	0	0	0	0	0
SO. ATL.											
Delaware	6	2	0	0	0	0	0	0	0	0	0
Maryland [2]	126	53	0	0	0	5	0	0	0	2	0
District of Columbia	17	10	0	0	0	0	0	0	0	1	0
Virginia	29	35	0	0	0	16	0	0	0	1	0
West Virginia	23	35	0	0	0	0	0	0	0	0	0
North Carolina	33	118	0	0	0	0	0	0	0	0	3
South Carolina	32	28	0	1	0	0	0	0	0	2	4
Georgia	9	13	0	1	2	0	0	0	0	0	29
Florida	3	10	0	0	0	0	0	0	0	1	4
E. SO. CEN.											
Kentucky	15	60	0	0	0	0	0	0	0	2	0
Tennessee	42	12	0	0	0	0	0	0	0	0	4
Alabama	5	6	0	0	0	0	0	0	0	1	15
Mississippi [2]	----	----	0	0	0	0	0	0	0	0	1
W. SO. CEN.											
Arkansas	20	2	0	2	1	0	0	0	0	0	0
Louisiana	4	1	0	1	7	0	0	1	0	1	3
Oklahoma	11	4	0	0	0	0	0	0	0	0	0
Texas	161	69	0	5	75	0	0	0	0	0	24
MOUNTAIN											
Montana	33	59	0	0	0	0	1	0	0	0	0
Idaho	0	3	0	0	0	0	0	0	0	0	0
Wyoming	2	15	0	0	0	0	0	0	0	0	0
Colorado	14	38	0	1	2	0	0	0	0	0	0
New Mexico	16	16	0	0	0	0	0	0	0	0	0
Arizona	32	60	0	0	0	40	0	0	0	0	0
Utah [2]	17	23	0	0	0	0	0	0	0	0	0
Nevada	4	5	0	0	0	0	0	0	0	1	0
PACIFIC											
Washington	22	103	0	0	0	0	0	0	0	0	0
Oregon	5	35	0	0	0	0	0	0	0	0	0
California	248	151	0	8	8	0	0	0	0	0	3
Total	3,572	3,633	1	20	116	62	2	1	0	24	90
49 weeks	169,469	199,305									

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended November 28, 1942

This table lists the reports from 89 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza: Cases	Influenza: Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Atlanta, Ga	1	0	1	0	0	0	7	0	7	0	0	0
Baltimore, Md	2	0	3	1	2	5	14	0	15	0	0	64
Barre, Vt	0	0	------	0	48	0	0	0	0	0	0	0
Billings, Mont	0	0	------	0	0	0	0	0	0	0	0	0
Birmingham, Ala	1	0	1	1	1	0	3	0	4	0	0	5
Boise, Idaho	0	0	------	0	0	0	0	0	0	0	0	0
Boston, Mass	0	0	------	1	1	1	13	0	59	0	0	42
Bridgeport, Conn	0	0	------	0	0	0	0	0	2	0	0	3
Brunswick, Ga	[illegible]	0	------	0	0	0	0	0	1	0	0	0
Buffalo, N. Y	0	0	------	0	34	0	9	0	4	0	0	17
Camden, N. J	1	0	------	0	0	0	2	0	0	0	0	4
Charleston, S. C	1	0	45	0	0	0	0	0	2	0	1	0
Charleston, W. Va	0	0	------	0	0	0	0	0	2	0	0	0
Chicago, Ill	6	0	5	2	19	0	19	0	57	0	1	87
Cincinnati, Ohio	3	0	------	0	9	0	5	0	18	0	0	9
Cleveland, Ohio	3	0	4	1	1	1	10	0	44	0	0	63
Columbus, Ohio	0	0	1	1	0	0	4	0	17	0	0	2
Concord, N. H	0	0	------	0	0	0	1	0	3	0	0	0
Cumberland, Md	0	0	------	0	0	0	0	0	0	0	0	0
Dallas, Texas	0	0	1	1	0	0	2	0	2	0	0	4
Denver, Colo	2	0	12	0	3	0	7	0	5	0	0	5
Detroit, Mich	1	0	------	2	1	1	20	1	28	0	1	60
Duluth, Minn	0	0	------	0	0	0	2	0	1	0	0	2
Fargo, N. Dak	0	0	------	0	0	0	0	0	0	0	0	0
Flint, Mich	2	0	------	0	0	0	5	0	2	0	0	8
Fort Wayne, Ind	0	0	------	0	0	0	1	0	0	0	0	0
Frederick, Md	0	0	------	0	0	0	0	0	0	0	0	0
Galveston, Texas	1	0	------	0	0	0	1	0	1	0	0	0
Grand Rapids, Mich	0	0	------	0	1	0	1	0	1	0	0	3
Great Falls, Mont	0	0	------	0	0	0	1	0	6	0	0	3
Hartford, Conn	0	0	------	0	1	0	4	0	2	0	0	7
Helena, Mont	0	0	------	0	0	0	0	0	0	0	0	1
Houston, Tex	1	0	------	0	0	0	3	1	1	0	0	2
Indianapolis, Ind	1	0	------	1	2	0	6	0	8	0	0	10
Kansas City, Mo	1	0	------	0	0	0	4	0	21	0	0	1
Kenosha, Wis	0	0	------	0	1	0	0	0	3	0	0	0
Little Rock, Ark	0	0	6	0	0	0	3	0	0	0	1	0
Los Angeles, Calif	18	0	24	1	5	2	7	4	18	0	0	14
Lynchburg, Va	1	0	------	0	0	0	1	0	0	0	0	0
Memphis, Tenn	1	0	1	1	1	0	5	0	4	0	0	20
Milwaukee, Wis	0	0	------	0	14	0	6	0	45	0	0	31
Minneapolis, Minn	0	0	------	1	1	0	4	2	22	0	1	8
Missoula, Mont	0	0	------	0	0	0	0	0	0	0	0	0
Mobile, Ala	6	0	1	1	1	0	4	0	2	0	0	0
Nashville, Tenn	0	0	------	0	0	0	5	0	6	0	0	0
Newark, N. J	0	0	2	0	2	1	6	0	9	0	0	12
New Haven, Conn	0	0	------	0	0	0	0	0	5	0	0	12
New Orleans, La	0	0	1	1	0	0	5	0	3	0	1	0
New York, N. Y	13	0	9	2	13	4	77	0	114	0	2	81
Omaha, Nebr	2	0	------	0	0	0	6	0	7	0	0	1
Philadelphia, Pa	0	0	4	1	309	3	17	0	[illegible]	0	4	128
Pittsburgh, Pa	3	0	2	3	0	1	5	0	9	0	0	36
Portland, Maine	0	0	------	0	0	8	2	0	0	0	0	26
Providence, R. I	0	0	------	0	0	0	6	0	3	0	0	18
Pueblo, Colo	0	0	------	0	2	0	0	0	3	0	0	0
Racine, Wis	0	0	------	0	9	0	0	0	8	0	0	0
Raleigh, N. C	0	0	------	0	3	0	0	0	4	0	0	0
Reading, Pa	0	0	------	0	2	0	1	0	2	0	0	2
Richmond, Va	0	0	------	0	1	0	5	0	1	0	0	7

City reports for week ended November 28, 1942

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va	0	0	------	0	0	0	1	0	0	0	0	1
Rochester, N. Y	0	0	------	0	2	0	9	0	4	0	0	22
Sacramento, Calif	8	0	2	0	2	1	0	0	5	0	1	6
Saint Joseph, Mo	0	0	------	0	0	0	1	0	0	0	0	0
Saint Louis, Mo	2	0	2	1	1	0	10	1	14	0	0	8
Saint Paul, Minn	0	0	------	0	1	0	8	0	6	0	0	9
Salt Lake City, Utah	0	0	------	0	110	0	2	0	8	0	0	4
San Antonio, Tex	8	0	2	0	1	0	10	9	1	0	0	2
San Francisco, Calif	2	0	1	1	4	0	15	2	17	0	1	4
Savannah, Ga	0	0	2	2	0	0	1	0	1	0	0	4
Seattle, Wash	0	0	------	0	10	1	8	0	8	0	1	14
Shreveport, La	2	0	------	0	0	0	6	0	0	0	0	0
South Bend, Ind	0	0	------	0	0	0	0	0	0	0	0	0
Spokane, Wash	0	0	1	1	28	2	1	0	7	0	0	0
Springfield, Ill	0	0	------	0	0	0	0	1	1	2	0	18
Springfield, Mass	0	0	------	0	2	0	6	0	58	0	0	1
Superior, Wisc	0	0	------	0	1	0	0	0	2	0	0	2
Syracuse, N. Y	0	0	------	0	1	1	1	8	1	0	0	14
Tacoma, Wash	1	0	------	0	94	0	8	0	1	0	0	2
Tampa, Fla	0	0	------	0	0	0	2	0	0	0	1	0
Terre Haute, Ind	0	0	------	0	0	0	1	0	1	0	0	0
Topeka, Kans	0	0	------	0	2	0	5	0	2	0	0	1
Trenton, N. J	0	1	------	0	1	1	1	0	1	0	0	8
Washington, D. C	1	0	1	0	2	8	5	0	21	0	1	20
Wheeling, W. Va	0	0	------	0	0	0	2	0	0	0	0	0
Wichita, Kans	0	0	------	0	1	0	5	0	2	0	0	9
Wilmington, Del	0	0	------	0	0	0	3	0	0	0	0	18
Wilmington, N. C	1	0	------	0	1	0	0	0	1	0	0	3
Winston-Salem, N. C	0	0	------	0	0	0	0	0	1	0	0	1
Worcester, Mass	0	0	------	0	1	0	8	0	5	0	0	11

Dysentery, amebic.—Cases: New Haven, 1; New York, 5; San Francisco, 1.

Dysentery, bacillary.—Cases: Detroit, 4; Los Angeles, 11; New York, 8; Philadelphia, 2; Richmond, 3; San Francisco, 1; Syracuse, 1.

Tularemia.—Cases: Pittsburgh, 2.

Typhus fever.—Cases: Atlanta, 1; Baltimore, 1; Charleston, S. C., 2; Dallas, 1; Houston, 1; Little Rock, 1; Nashville, 2; New Orleans, 1; New York, 1; Savannah, 1; Shreveport, 1; Winston-Salem, 1.

Rates (annual basis) per 100,000 population for the group of 89 cities included in the preceding table (estimated population, 1942, 34,018,770)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Week ended Nov. 28, 1942	13.34	20.54	4.14	115.26	63.30	117.41	0.31	2.61	147.91
Average for week 1937–41	13.74	14.90	[1] 2.62	[2] 106.73	[1] 53.97	88.23	.73	2.83	118.76

[1] 3-year average, 1939–41.
[2] 5-year median.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended November 14, 1942.—During the week ended November 14, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	1				4				6	11
Chickenpox		10		181	291	65	39	27	52	665
Diphtheria		26	1	36	2	9	2			76
Dysentery				126		1				127
Encephalomyelitis							1			1
German measles				5	8		4		9	26
Influenza		4			8				117	129
Lethargic encephalitis						1				1
Measles		15		28	44	11	43	3	7	151
Mumps		29	1	135	356	25	44	17	206	813
Pneumonia		2			5	1			20	28
Poliomyelitis				1	1				2	4
Scarlet fever		12	41	62	86	12	32	35	61	341
Tuberculosis	8	7	6	53	51	9	35	7	22	198
Typhoid and paratyphoid fever		1	2	8	1	1				13
Undulant fever					1					1
Whooping cough		8	1	163	120	24	2	13	18	344
Other communicable diseases		6		2	251	34	2	5	2	302

CUBA

Habana—Communicable diseases—4 weeks ended November 14, 1942.—During the 4 weeks ended November 14, 1942, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	25		Poliomyelitis	5	
Malaria	12		Tuberculosis	4	
Measles	5		Typhoid fever	15	2

Provinces—Notifiable diseases—4 weeks ended November 7, 1942.—During the 4 weeks ended November 7, 1942, cases of certain notifiable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	2	1	5	11		5	24
Diphtheria	2	32	2	1	9	1	47
Leprosy				1		2	3
Malaria	365	14		57	8	221	665
Measles		2				11	13
Poliomyelitis	9	9	7	22	10	13	70
Rabies		1					1
Tuberculosis	10	16	27	38	2	39	132
Typhoid fever	8	27	18	33	3	23	112
Typhus fever						1	1
Yaws						1	1

[1] Includes the city of Habana.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Peru—Lima Department—Barranca.—During the month of October 1942, 2 cases of plague were reported in Barranca, Lima Department, Peru.

Typhus Fever

Irish Free State—Galway County.—During the week ended November 21, 1942, 8 cases of typhus fever were reported in the rural district of Galway County, Irish Free State.

Rumania.—For the week ended November 21, 1942, 24 cases of typhus fever were reported in Rumania.

Tunisia.—For the period October 11–20, 1942, 38 cases of typhus fever were reported in Tunisia.

Turkey.—For the week ended November 21, 1942, 8 cases of typhus fever were reported in Turkey.

Yellow Fever

Colombia—Intendencia of Meta.—On October 31, 1942, 1 death from yellow fever was reported in Intendencia of Meta, Colombia.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

E. R. COFFEY, *Assistant Surgeon General, Chief of Division*

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ORNITHODOROS TICKS AS A MEDIUM FOR THE TRANSPORTATION OF DISEASE AGENTS[1]

By R. R. PARKER, *Director, Rocky Mountain Laboratory, United States Public Health Service*

Reports by Brumpt (*1*, *2*) and by Davis (*3*, *4*, *5*) have shown that *Ornithodoros turicata* and *O. parkeri* may harbor in their tissues for extended periods certain disease agents of which they are not known to be spontaneous hosts or transmitters. In *O. turicata* the disease agents concerned were the rickettsiae of Rocky Mountain spotted fever, São Paulo typhus and American "Q" fever, and *Pasteurella tularensis;* in *O. parkeri,* the rickettsia of Rocky Mountain spotted fever and *P. tularensis.* The duration of the periods during which these respective organisms have been recovered from the ticks following the ingestion of infective blood from guinea pigs has ranged from 216 to 1,001 days. In most of these tests the ticks received the infective blood meal in one of the immature stages, mostly as early nymphs, and the respective disease agents were recovered from one or more subsequent stages of the same generation. Except in one combination of tick species and disease agent, recovery of the latter was only accomplished by injecting saline suspensions of the test ticks into guinea pigs. The exception was *O. parkeri* and the rickettsia of Rocky Mountain spotted fever. In this test, transmission by tick bite was usual and the rickettsia was also recovered, by injection, from the eggs of the next generation.

These findings suggested that ticks of this genus might be used as a medium to transport disease agents such as rickettsiae and viruses where long periods of transit are involved. Three successful attempts to do so are reported,[2] the disease agents being the rickettsiae of Tobia petechial fever of Colombia and of South African tick-bite fever and the virus of spring-summer encephalitis of the U. S. S. R.

Tobia petechial fever and Ornithodoros rudis.—On September 29, 1940, Dr. L. Patino-Camargo, Director of the Instituto Federico Lleras of Bogota, Colombia, permitted 7 specimens of *O. rudis* to ingest blood from a guinea pig infected with Tobia petechial fever

[1] Contribution from the Rocky Mountain Laboratory, Hamilton, Mont., Division of Infectious Diseases, National Institute of Health.

[2] The tests for the recovery of the rickettsiae concerned were made by Dr. Edward A. Steinhaus, Dr. Gordon E. Davis, and the author. The recovery of spring-summer encephalitis virus in white mice was accomplished by Dr Herald R. Cox.

(Colombian spotted fever). On October 3 the ticks were sent by air mail to the Rocky Mountain Laboratory. Six were alive upon their arrival on October 8.

On October 9 a salt solution suspension of each of two ticks was injected intraperitoneally into two guinea pigs. Three exhibited fever curves and scrotal lesions similar to those of Rocky Mountain spotted fever. The fourth was lost. Two passage strains were initiated and subsequent tests showed complete cross immunity between the Colombian disease and Rocky Mountain spotted fever.

Two more ticks were similarly tested on October 12 but the infectious agent was not recovered.

The remaining two ticks, one male and one female, were tested immediately after arrival by feeding on guinea pigs; results were negative. The female then died. On November 21 the male was injected into guinea pigs and the rickettsia was again recovered.

The first recovery of the rickettsia was 11 days after its ingestion by the ticks; the second was 53 days.

South African tick bite fever and Ornithodoros moubata.—On October 17, 1940, several specimens each of nymphal *O. parkeri* and *O. turicata* were forwarded in modified Hixon jars [3] to Dr. J. H. S. Gear of the South African Institute for Medical Research at Johannesburg. It was requested that the ticks be permitted to feed on guinea pigs infected with South African tick-bite fever and returned in the same jars in which they were forwarded.

Under date of April 3, 1941, Dr. Gear advised that return shipment had been made. However, the *O. parkeri* had died and four adult and one nymphal *O. moubata* had been substituted for this species. Both the *O. moubata* and the *O. turicata* had been fed on an infected guinea pig on "the second day of fever and scrotal reaction." The host guinea pig was a second passage animal of a "fairly severe" strain established from a case exhibiting "the typical clinical picture of primary sore, severe headache, delirium, and a profuse relatively coarse maculopapular rash involving the palms of the hands, the soles of the feet and the face." The ticks were received at Hamilton, Mont., on May 9.

There were five *O. turicata* nymphs which were tested in two groups of two and three ticks, with negative findings.

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[3] Hixon (6) described the following apparatus for use in rearing ticks: "A small vial about three-fourths inch in diameter and 3 inches long was filled about one-fourth full of sand saturated with water. A ¼-inch glass tube was inserted through a cork so that it extended almost to the sand when the cork was fitted into the vial. Cellu-cotton plugs were used to stopper each end of the glass tube. The engorged larvae and nymphs were placed in the tube between the cello-cotton plugs for further development."

This device has been modified by Dr. R. A. Cooley as follows: A wide-mouthed bottle, a size appropriate for the desired use, was substituted for the vial and plaster of paris for the sand. In this form the device is usable not only in the laboratory but also in the field and for long-distance shipment. The larger cork stopper permits the use, if desired, of a tube of larger diameter for holding ticks. For a 4-ounce bottle, 12 drops of water are added to the thoroughly dried plaster of paris.

The *O. moubata* were tested in three groups of two females, two males, and one nymph. Saline suspensions were prepared and each was injected into two guinea pigs. The tests of the males and the single nymph were negative, but both guinea pigs receiving the suspension of female ticks developed typical fevers and swelling and reddening of the scrotum. These findings and the gross pathology of the viscera were apparently identical with those described for South African tick-bite fever. Cross-immunity reactions with Rocky Mountain spotted fever, São Paulo typhus, Tobia petechial fever, boutonneuse fever, and epidemic and endemic typhus were also similar to those of boutonneuse fever with which this disease is evidently closely related, if not identical.

This rickettsia was recovered 36 days after the ticks were mailed. The infective blood was presumably ingested within a few days previous to mailing.

Spring-summer encephalitis and Ornithodoros moubata.—In November 1940, a letter was addressed to Dr. M. P. Chumokov of the All-Union Institute of Experimental Medicine at Moscow, U. S. S. R., requesting that he attempt to send the virus of spring-summer encephalitis to the Rocky Mountain Laboratory. It was suggested that he use the method which he believed was most likely to result in the virus reaching this country in viable condition. It was also requested that he send specimens of a native species of *Ornithodoros* which had been permitted to engorge on an infected mouse.

On June 7, 1941, Dr. Chumokov forwarded by mail numerous larvae of *Ixodes persulcatus* (the native transmitting agent) from infected stock, desiccated infected mouse brain, and two adult specimens of *O. moubata* which had been permitted to engorge under the conditions requested. Apparently it had been more feasible to use *moubata* from a stock strain than a native species of *Ornithodoros*. A modified Hixon jar was again used for forwarding the ticks.

The materials were received on July 17 and were tested immediately. The virus was not recovered from either the *I. persulcatus* (most of which were alive) or the desiccated mouse tissue. However, it was recovered in white mice from the *O. moubata*, a broth suspension of which was used in injecting the mice intracerebrally.

The date on which the *O. moubata* ingested infective blood is unknown, but recovery of the virus was made 40 days after the ticks were mailed.

SUMMARY

Three attempts to use ticks of the genus *Ornithodoros* as a medium for importing from foreign countries disease agents of which they are not known to be normal hosts or vectors have been successful. The diseases, the tick species, and the minimum intervals between the

ingesting of blood of infected guinea pigs by the ticks and the subsequent recovery of the disease agents from them were as follows: Tobia petechial fever, *O. rudis*, 11 days and 53 days; South African tick-bite fever, *O. moubata*, 36 days; spring-summer encephalitis, *O. moubata*, 40 days. The recoveries were not made by tick bite but by injecting guinea pigs with saline suspensions of the tick tissues in the case of the rickettsial diseases and a broth suspension in the case of spring-summer encephalitis.

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VARIATIONS IN RAT INFESTATION ON VESSELS

By ROBERT OLESEN, *Medical Director*, and G. C. SHERRARD, *Acting Assistant Surgeon, United States Public Health Service*

At the New York Quarantine Station an excellent opportunity has been afforded for observing the incidence of rats on vessels. A degree of comparative accuracy attends the statistics gathered over a period of years because the results are based on the number of rats actually recovered after fumigation, thereby differing from the method of estimation, which has its obvious deficiencies.

Fumigations from 1924 to 1930.—The records available at the quarantine station since 1924 show a considerable number of fumigations though not an unduly high average of rats recovered from each vessel. Table 1 shows an annual total of more than 1,000 vessels fumigated in each of the three years from 1924 to 1926, inclusive. During these years the average number of rats killed by fumigation ranged between 8.7 and 10.2 per vessel. Thereafter the average number of rats recovered on each vessel following fumigation failed to decline perceptibly until 1930, when an average of 7.7 was reached.

TABLE 1.—*Number of vessels fumigated, total rats recovered, and average number recovered on each vessel fumigated at the New York Quarantine Station from 1924 to 1942, inclusive*

Year	Number vessels fumigated	Number rats recovered	Average number rats each vessel
1924	1,011	10,379	10.2
1925	1,179	10,516	8.9
1926	1,120	9,789	8.7
1927	936	9,324	9.9
1928	828	8,565	10.3
1929	873	9,625	11.0
1930	837	6,510	7.7
1931	566	3,353	5.9
1932	283	2,684	9.4
1933	190	1,779	9.3
1934	211	1,593	7.5
1935	204	2,374	11.6
1936	218	1,553	7.1
1937	202	2,666	13.1
1938	178	2,481	13.9
1939	118	1,473	12.4
1940	83	1,751	21.0
1941	90	2,241	24.9
1942	118	3,797	32.1

Fumigations from 1930 to 1940.—During the 5 years from 1930 fewer vessels were fumigated and a lower average of recoveries were recorded, these ranging between 5.9 and 9.3 for each vessel. In 1935 the average number of rats on each vessel fumigated was 11.6. Thereafter, except in 1936 and 1939, there were steady increases in average numbers to the present time. Coincidentally fewer fumigations were performed. It should be noted particularly that fewer fumigations were performed in 1940 than in any other single year; 83 were recorded in that year. However, during 1940 an average of 21 rats was killed on each of the vessels fumigated. In individual instances the numbers were high.

Ratproofing.—The decrease in the number of fumigations from 1924 to 1940 and the fluctuations in rat recoveries raise a number of interesting conjectures, especially as the New York Quarantine Station has been active in devising and applying methods of rat control. Foremost in repressive measures was the formulation of methods whereby both new and old vessels might undergo ratproofing, this being a procedure directed primarily toward the elimination of potential harborages during construction.[1 2]

Rat infestation inspections.—Methods have also been devised and many individuals trained in estimating the number and locations of rodents on vessels. Success in estimating depends largely upon train-

[1] Ratproofing of new ships. P. W. Clark. Supplement No. 151 to the Public Health Reports. U. S. Government Printing Office, 1939.

[2] Much of the credit for pioneering in the field of ship ratproofing and the subsequent developments therein belongs to Passed Assistant Pharmacist B. E. Holsendorf (Retired) of the Public Health Service. The principles of ship ratproofing were later extended by Mr. Holsendorf to the ratproofing of buildings. He is co-author of Supplement No. 131 to the Public Health Reports, The rat and ratproof construction of buildings with specifications, drawings, and photographs and a model ratproofing ordinance. U. S. Government Printing Office, 1937.

ing and experience, forming incidentally a fascinating chapter in the perpetual war by public health workers against a cunning enemy. The application of these principles resulted in the restriction of fumigations to vessels on which there were definite evidences of rat infestation.

In the early days of frequent and somewhat haphazard ship fumigations it was noted that rat yields were frequently so small as to make the process of dubious value. Studies made in 1926 established the need for systematic preliminary inspections. The results of these studies were described by Akin and Sherrard[3] and prescribed as routine procedure in 1930. It was found, for instance, that a considerable amount of unnecessary fumigation was being done, there being only a few or no rats actually present on many of the vessels. Thereafter fumigations were based solely upon the results of carefully made inspections. As skill and experience were acquired, the method of making inspections was correspondingly improved in effectiveness and thoroughness.[4]

Trapping.—The question then arose as to the action necessary when relatively few rats were present on a vessel, while conditions such as ports visited and general sanitation were satisfactory. Trapping as a supplementary measure became active in 1927 and has proved both effective in reducing rat life and useful in lessening expense and time loss to shipping companies.[5] [6]

Sanitation in relation to infestation.—In a general way the degree of rat infestation is an indication of sanitary status. Therefore, fewer rats may be expected on a physically clean and tidy vessel than when opposite conditions prevail. If, for instance, food is accessible and there are harborages created by structural defects and improperly stored dunnage, rodents are more likely to be present. Recognizing the validity of this principle, considerable attention has been directed to improving the sanitation of vessels coming under the jurisdiction of the New York Quarantine Station.

One of the measures devised for better sanitary control has been the organization of sanitary units on vessels.[7] These units were in successful operation on large passenger vessels prior to the war and undoubtedly contributed to the exemption from fumigation enjoyed by many craft having their terminus in New York. Another plan, delayed for full installation by the war, is the so-called sanitary

[3] Ship fumigation determined by observed rodent infestation. C. V. Akin and G. C. Sherrard. Pub. Health Rep., 42: 861–867 (April 1, 1927).

[4] Rat infestation inspection of vessels. C. L. Williams. Pub. Health Rep., 47: 765–800 (April 1, 1932). (Reprint No. 1529).

[5] Trapping rats on ships. Pub. Health Rep., 55: 1057–1061 (June 14, 1940) (Reprint No. 2170).

[6] Effectiveness of deratization of ships by trapping. G. C. Sherrard. Pub. Health Rep., 56: 1061–1063 (May 16, 1941).

[7] The organization and operation of sanitary units on shipboard. G. C. Sherrard. Pub. Health Rep., 55: 470–473 (March 15, 1940).

log.[8] The "log" provides for a cumulative sanitary record kept jointly by inspectors of the Public Health Service and officers of vessels. By stimulating ship personnel in guided sanitary effort the plan will enhance still further the maintenance of acceptable sanitation and the accompanying reduction of rat life.

Laboratory control.—It must not be supposed that the sole interest of the Public Health Service in rodents is in their extermination. At the New York Quarantine Station rats killed by fumigation or trapping on vessels are removed to the station laboratory for examination. The few fleas remaining on the rat bodies are recovered by combing and are identified. The rats are also classified and then autopsied for gross pathological lesions. If sufficient fleas are available they are ground in a mortar with normal salt solution and injected into guinea pigs. If, as frequently happens, fleas are not present, pooled material from the internal organs of every 10 rats is prepared for injection into experimental animals. The animals are then kept under observation for a period sufficiently long to determine whether there is a reaction to the material injected.

Although plague infection has fortunately not been encountered after these trial injections the procedure is steadily maintained so that infection may be discovered promptly and necessary control measures initiated. At the same time, by having technicians, equipment, and animals constantly available, with facilities capable of immediate expansion, the station is prepared for eventualities.

Decline in number of fumigations.—The steady decline in the number of fumigations to 1940 may in part be ascribed to the appreciation by persons associated with commercial shipping, including agents, owners, and operators of vessels, of the handicaps under which vessels operate when infested with rodents. Failure to keep a vessel generally clean and free of accessible food that might be utilized for rat sustenance, to eliminate rat harborages, and to "build out" the rat whenever practicable have all caused grave losses to shipping interests. Then, too, the loss of time and money, as well as the inconvenience and expense attendant upon fumigation, have stimulated persons responsible for the expeditious and economical operation of vessels to exert themselves in maintaining rat-free craft.

The effectiveness of fumigation has also been increased by more thorough preparation of vessels for this process. For some time it has been the practice to detail a competent inspector to visit the vessel on the day prior to a scheduled fumigation and supervise necessary preparations, thereby insuring the best possible results from the liberation of the fumigant.

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[8] A sanitary log for American ships: G. O. Sherrard. Pub. Health Rep., 55:2167-2171 (November 22, 1940).

Beginning in 1940, a puzzling situation developed. Although the fewest number of annual fumigations in 17 years was performed, the average number of rats recovered from each vessel increased sharply. This possibly indicated indifference on the part of a few operators of vessels to regard seriously the presence of rats and failure to apply repressive measures. There was also indicated increased skill in selecting and fumigating the vessels most in need of this treatment.

War causes an increase in fumigations.—Since 1940 the number of fumigations has gradually increased, and the average rat recoveries from each vessel have been greater than during previous years. This has been due to the considerable increase in the number of "tramp" vessels coming to New York, vessels over which competent sanitary supervision had not been previously exercised.

It is particularly to be noted that the increases, both in fumigations and rat recoveries, have occurred during the past three years, when nations have been at war. Engrossed in the many rigid demands of war service, embarrassed by loss of skilled public health personnel and equipment, to say nothing of the constant demand for speed in loading and dispatching vessels, less attention than formerly is being directed to the sanitary supervision of vessels in foreign ports.

The decline in competent supervision has communicated itself to the operating personnel of vessels. In view of the need for quick "turn arounds," the shortage of seagoing personnel, and the dangers to persons operating oceangoing craft, it is not surprising that sanitation has suffered during the emergency.

Comment.—Despite continuing losses of trained personnel, the Public Health Service maintains sanitary surveillance over vessels entering United States ports. However, this is becoming increasingly difficult, as rodent control is being submerged by purely war effort. In the meantime, vessels of the armed forces, both regular and auxiliary, are calling at ports actually or presumably infected with bubonic plague and other quarantinable diseases. The quarantinable diseases, named in the International Sanitary Convention and the United States quarantine regulations, are subject to special control measures.[9]

It is not pleasant to contemplate the effect upon the public health and the war effort by the introduction of quarantinable diseases into the United States. Suffice it to say that the presence of such diseases would necessitate the diversion of personnel and funds to widespread public health and sanitary effort to the detriment of war activities. Therefore, it becomes increasingly important to maintain rat control, among other precautions, on arriving vessels, though the effort is unfortunately handicapped somewhat by the secrecy necessarily attending ship movements and other factors already mentioned.

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[9] Ship hygiene and sanitation. Robert Olesen. Supplement No. 114 to the Public Health Reports (revised 1940).

THE INCIDENCE OF CANCER IN DENVER, COLORADO, 1939 [1]

By HERBERT J. SOMMERS, *United States Public Health Service*

During the period 1938–1940, the United States Public Health Service made a series of ten field studies of the incidence and prevalence of cancer in the United States. Reports on the first nine of these studies have been completed, and have either been published or are awaiting publication (*1–9*). The present paper is a report on the city of Denver, Colo.

The information obtained for each cancer case in these surveys included the sex, age, and color of the patient, the primary site of the malignant growth, the method of diagnosis, and the known duration of the cancer. For a complete explanation of the items tabulated, as well as a detailed outline of the procedure of the survey, reference should be made to the first article in this series (*1*). It is sufficient here to state that the data were requested from every doctor and hospital in the area and that supplementary data were obtained from death certificates on file in the Colorado State Division of Public Health.

In Denver, reports were obtained from 624 of the 638 practicing physicians, and from every one of the 43 hospitals and related institutions. From these sources, a grand total of 3,753 cases of cancer was reported for the year 1939. However, many of these cases were duplicates, i. e., were reported by more than one source. Since identifying information such as name, age, sex, and color had been obtained, it was possible to combine all reports on a single case and thus eliminate duplication. Of course, in the incidence and prevalence analyses which follow, each case is counted only once, regardless of how many doctors and hospitals saw and treated it. The actual number of duplications eliminated was 1,021, leaving 2,732 individual cancer cases reported as having been seen or treated in Denver in 1939.

Of the 2,732 cancer cases, 1,601 were residents of Denver and 1,131 were nonresidents; 1,501 were female and 1,231 were male. Since only 28 of the 2,732 cases were colored, no separate listings by color have been made in this report.

In Denver during 1939, 533 death certificates listing cancer as a cause of death were filed with the Department of Vital Statistics of the Colorado Division of Public Health. Among the 533 deaths, 436 were residents of Denver, and of the latter number, 37 had not been included among the 1,601 resident cancer cases reported by the

[1] From the Division of Public Health Methods, National Institute of Health The data for this study were collected under the supervision of Arthur J. McDowell Miss Bess A Cheney was in immediate charge of the tabulation of the data which was done as a project, Number 65-2-23-356, of the Work Projects Administration. The entire survey was directed by Harold F Dorn

doctors and hospitals. [illegible], therefore, the total number of resident cases of cancer in Denver in 1939 was 1,638.

Based on a population of 316,124 [2] the cancer prevalence rate was 518.2 cases per 100,000 persons. The rate was considerably higher for females than for males, 602.4 compared with 429.0 (table 1). Only San Francisco and Alameda Counties, Calif., among the study areas, had a higher cancer case rate than Denver. The rate in that area was 525.9 per 100,000.

TABLE 1.—*Number of reported cases and recorded deaths from cancer, Denver, Colo., 1939*

	Males	Females	Both sexes
Reported cases of cancer	1,231	1,501	2,732
Residents	645	956	1,601
Nonresidents	586	545	1,131
Recorded cancer deaths [1]	222	306	528
Reported as a case:			
Residents	159	240	399
Nonresidents	49	43	92
Not reported as a case			
Residents	14	23	37
Nonresidents	(1)	(1)	(1)
Total resident cases [2]	659	979	1,638
Total resident deaths [1]	173	263	436
Ratio of resident cases to deaths	3 8	3 7	3 8
Prevalence rate per 100,000 population [3]	429 0	602 4	518. 2

[1] From the Colorado State Division of Public Health. Five death certificates, for nonresidents not reported as a case, are excluded here

[2] Reported resident cases plus recorded cancer deaths of residents not reported as a case

[3] Based on the preliminary count of the 1940 census for both sexes, interpolated as of July 1, 1939, and then distributed by sex according to the 1930 census distribution

NATURE AND NUMBER OF REPORTING SOURCES

Just over half, 50.6 percent, of all the cancer cases reported in Denver were reported by a doctor or by several doctors; 30.6 percent of all the cases were reported by hospitals only; and 18.8 percent were reported by both doctor(s) and hospital(s). Male cases were reported by hospitals in a greater proportion of the cases than were female. Reports of male cases were unduplicated more often than reports of female cases, 79 percent as compared with 71 percent. Of all the cases reported, 75 percent were reported once only, 18 percent were reported twice, and the remaining 7 percent were reported by three or more sources (table 2).

[2] The population used is an interpolated one for July 1, 1939, and is based on the 1930 census and the preliminary count of the 1940 census. The figure is 316,124. This total was then distributed by sex in the proportions of the 1930 census figures, giving 153,608 males and 162,516 females

TABLE 2.—*The percent of cancer cases reported by nature and number of reporting sources, by sex, Denver, Colo., 1939*

Nature and number of reporting sources	Percent of reported cases		
	Males	Females	All cases
Doctor(s) only	49.6	51.4	50.6
Hospital(s) only	25.2	26.9	30.6
Doctor(s) and hospital(s)	15.2	21.7	18.8
1 source only	79.3	70.8	74.6
2 sources	14.2	21.9	18.4
3 or more sources	6.5	7.3	7.0
Any and all sources	100.0	100.0	100.0

CONFIRMATION OF DIAGNOSIS

Every case diagnosed as malignant was included in the survey, regardless of whether or not a microscopic examination of tissue had been made to confirm the diagnosis. However, one of the items of information recorded was whether or not such an examination was made. In table 3 the percentages of microscopically diagnosed cases are listed according to the primary site of malignant growth and the nature of the reporting source.

There was a confirming biopsy or necropsy in 55 percent of all the cancer cases reported in Denver. This is a lower percentage of microscopically diagnosed cases than was found in the surveys of Detroit, San Francisco-Alameda, Chicago, Philadelphia, and Pittsburgh, where the percentages were 78, 72, 70, 70, and 62, respectively, but is higher than any of the figures for the southern study cases: Atlanta, 52 percent; New Orleans, 52 percent; Dallas and Fort Worth, 50 percent, and Birmingham, 41 percent.

TABLE 3.—*The percentage of reported cancer cases that had a microscopically confirmed diagnosis, by primary site and whether reported by a hospital, Denver, Colo., 1939*

Primary site	Percentage of cases microscopically diagnosed		
	Doctors only	Cases reported by hospitals [1]	All sources
Buccal cavity	29.6	60.2	41.2
Digestive tract	43.1	60.0	54.5
Respiratory system	48.3	71.4	60.9
Genitourinary system	72.6	73.8	73.4
Breast	66.8	81.0	73.8
Skin	17.3	51.6	27.0
Brain	50.0	57.9	56.0
Bones	61.5	78.3	72.2
All other sites	56.9	71.0	65.0
All sites	43.4	67.2	55.1

[1] This group includes cases reported by hospitals only and cases reported by both hospitals and doctors.

An examination of the percentages for each primary site shows marked variation in the frequency of microscopic diagnoses. Only 54 percent of the digestive tract cancer diagnoses were verified by tissue examination, whereas biopsies or necropsies were reported for 74 percent of the breast cancers. In general, the frequency of microscopic

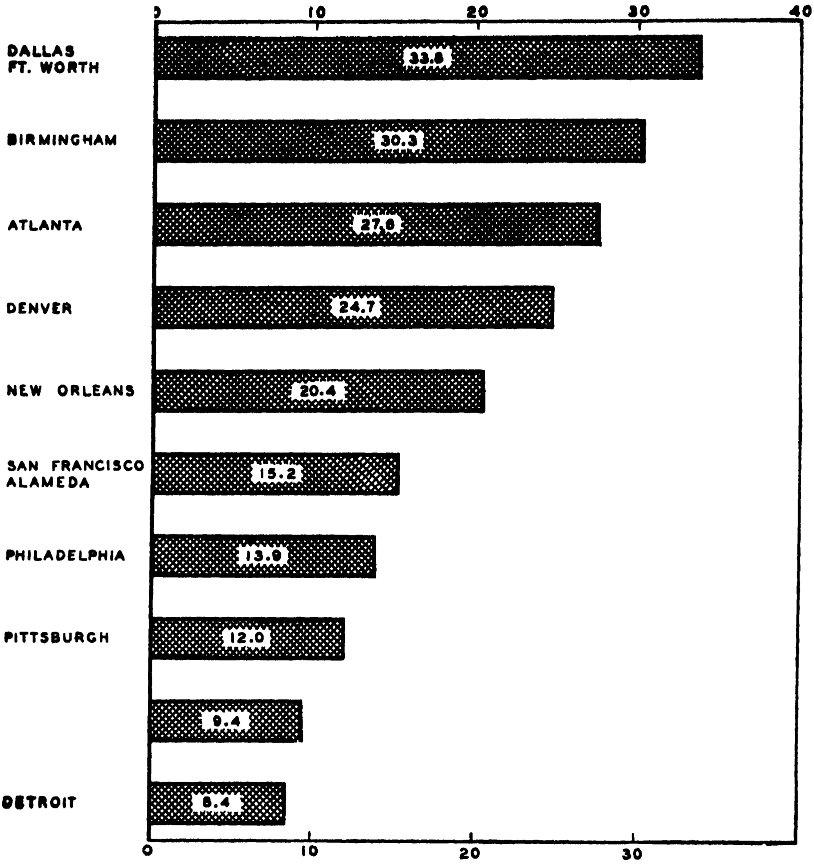

FIGURE 1.—Percentage of cases that were skin cancer in selected urban areas, 1937–39.

diagnosis was associated with accessibility of site, the two exceptions to this being the skin and buccal cavity.

The tendency to diagnose skin cancers clinically accounts for most of the variation in frequency of microscopic examinations among the various cities. As is shown in figure 1, skin cancer composed much larger percentages of the total cases in Denver and the four southern areas than in the four northern areas and San Francisco-Alameda. Of course, the southern cities and Denver, with relatively more skin cancer, had proportionately fewer biopsies.

DISTRIBUTION OF THE CASES BY PRIMARY SITE

There are sharp differences between male and female cancer cases in the relative frequency of the various sites of malignant growth (table 4). Among males, the most frequent sites reported were the skin, with nearly one-third of all the male cases, 32.9 percent, and the genitourinary system, with 20.9 percent. For females, the most frequent sites were the genitourinary system, 30.5 percent, and the breast, 27.0 percent. Buccal cavity cancers were much more frequent among males than among females (16.3 percent as compared with 3.2 percent), as were cancers of the respiratory system and of the brain.

TABLE 4.—*The percentage distribution of reported cases of cancer and the prevalence rates per 100,000 population, by primary site and sex, Denver, Colo., 1939*

Primary site	Males		Females	
	Percentage distribution [1]	Prevalence rate per 100,000 population [2]	Percentage distribution [1]	Prevalence rate per 100,000 population [2]
Buccal cavity	16.3	51 4	3.7	17.8
Lip	12.3	37.7	1.7	8.0
Others	4.0	13.7	2.0	9.8
Digestive tract	17.9	101.5	14.2	102.8
Stomach and duodenum	6.3	33 2	3 2	28.3
Intestines	2 9	17 6	3 8	28.9
Rectum, anus	4.6	24 1	3 9	21.6
Pancreas	1.9	10.4	1.2	8.0
Others	2.2	16.2	2 1	16.0
Respiratory system	4.1	17.6	.9	8.0
Larynx	1.1	3 9	.1	.6
Lungs and pleura	2.8	13.0	.7	6.2
Others	.2	.7	.1	1.2
Genitourinary system	20 9	95 7	30 5	179 7
Prostate	11.4	56.0		
Uterus			22 4	131.1
Kidneys	1.9	8.5	1 2	8 0
Bladder	4.9	21 5	2.0	12.3
Others	2.7	9.7	4.9	28.3
Breast	2	.7	27.0	165 6
Skin	32 9	136 7	18.0	101 5
Brain	1 1	3.3	7	1 2
Bones	1.9	5.8	9	4.3
All other sites	4 7	16 3	4 1	21.5
All sites	100 0	429 0	100 0	602 4

[1] The percentage distributions listed here are based on all reported cases and so are not strictly comparable with the prevalence rates which are based on reported resident cases plus resident cases from death certificates only. The former tend to be higher in the less fatal groups, there being relatively more nonresidents in those groups.

[2] The population used here is obtained as described in footnote 2, p. 1972.

PREVALENCE RATES BY PRIMARY SITE

Table 4 also lists the crude prevalence rates per 100,000 population for each of the broad site groups. About 137 cases of skin cancer

were reported for every 100,000 of the male population. The similar rate for females was 101.5 per 100,000. The prevalence rates for buccal cavity and for brain were nearly three times as great for males as for females, and the rate for respiratory system was more than twice as great for males. The rates for digestive tract cancer did not differ appreciably between males and females, despite the fact that digestive tract cancers made up a larger proportion of male than of female cases. This was so because the female prevalence rate for all sites combined was higher than the male. The two sites, uterus and breast, had a combined rate of 296.7 per 100,000, nearly one-half of the entire female prevalence rate.

AGE DISTRIBUTION OF REPORTED CANCER CASES

There was a decided difference in the age distribution of male and female cases, the female cases generally occurring at younger ages. Only 54 percent of the male cases were among persons under 65 years of age, as compared with 67 percent of the female cases. The chief reason for this difference lies in the primary site distributions of the male and female cases, shown in table 4. Nearly one-third of the male cases were primary in the skin, while almost half of the female cases were primary in the breast or uterus. As will be noted below, skin cancers occur most frequently at older ages, whereas cancers of the breast and uterus are most frequent in the middle period of life.

TABLE 5.—*Age distribution by primary site of reported male cases of cancer,*[1] *Denver, Colo., 1939*

Primary site	Percentage							Total cases of known age
	Under 25	25-34	35-44	45-54	55-64	65-74	75 and over	
Buccal cavity	2.2	6.0	13.2	22.5	25.3	19.8	11.0	182
Digestive tract	.5	.9	5.6	14.9	30.2	33.5	14.4	215
Respiratory system	4.0	4.0	20.0	26.0	26.0	12.0	8.0	50
Genitourinary system	2.4	4.0	4.0	8.3	21.7	35.5	24.1	253
Prostate	------	------	------	1.4	17.4	46.4	34.8	138
Other genitourinary	5.2	8.7	8.7	16.5	27.0	22.6	11.3	115
Skin	.7	1.3	6.5	16.3	22.5	28.9	23.8	307
All others	12.6	9.5	13.7	20.0	20.0	18.9	5.3	95
All sites	2.5	3.4	8.1	16.0	24.2	28.2	17.6	1,102

[1] 120 cases of unknown age are excluded from this table.

TABLE 6.—*Age distribution by primary site of reported female cases of cancer,*[1] *Denver, Colo., 1939*

Primary site	Percentage							Total cases of known age
	Under 25	25-34	35-44	45-54	55-64	65-74	75 and over	
Buccal cavity	6.1	4.1	10.2	12.2	26.5	30.7	10.2	49
Digestive tract	1.4	1.9	7.7	17.2	22.0	31.1	18.7	209
Respiratory system	7.7	15.3	7.7	30.8	30.8	7.7	--	13
Genitourinary system	1.4	5.7	13.2	26.1	28.5	19.0	6.1	441
Uterus	.3	5.6	12.8	29.8	28.4	17.5	5.6	320
Other genitourinary	4.1	5.8	14.0	16.5	29.0	23.2	7.4	121
Breast	---	4.4	15.2	24.8	29.5	18.9	7.2	887
Skin	.5	1.1	13.3	15.4	20.7	29.9	19.1	188
All others	9.6	4.8	14.5	21.7	24.1	15.7	9.6	83
All sites	1.6	4.1	12.8	22.2	26.5	22.4	10.4	1,370

[1] 131 cases of unknown age are excluded from this table

Age distributions for male and female cases of certain broad site classifications are presented in tables 5 and 6. It is evident that the primary site of the cancer varies considerably with the age of the patient. Although 40 percent of the total male cases occurred in persons aged 45 to 64, 48 percent of the male buccal cavity cases, 45 percent of the male digestive tract cases, 52 percent of the male respiratory system cases, and only 19 percent of the prostate cases occurred at those ages. The prostate cases were concentrated among males aged 65 and over. Although to a lesser extent, skin cancers were also found primarily among older persons.

Among females, 58 percent of the uterine and 54 percent of the breast cancers were found at ages 45 to 64. As among the males, skin cancer occurred most frequently at ages above 64.

It will be noted that the brain and bone cases were classed with "all other" sites in tables 5 and 6. This was done because there were too few of these cases in Denver to warrant any percentage distribution by age. In other study areas, however, it has been observed that the brain and bone cases occur most frequently among children and adolescents.

PRIMARY SITE DISTRIBUTION OF REPORTED CASES AND RECORDED DEATHS

The fatality of cancer is closely associated with the primary site of its occurrence. As a result, the frequency of occurrence of different primary sites varies considerably between living and dead cases. Cases of the digestive tract, respiratory system, brain, and prostate composed a larger part of the recorded deaths than they did of the reported cases of cancer. On the other hand, cases of the buccal cavity, uterus, breast, and skin were relatively more frequent among the living cases than among the deaths (table 7).

TABLE 7.—*Percentage distribution by primary site of resident reported cases and recorded deaths of cancer, Denver, Colo., 1939*

Primary site	Reported cases	Recorded deaths	Primary site	Reported cases	Recorded deaths
Buccal cavity	6.2	8.0	Breast	16.4	12.2
Digestive tract	19.2	40.8	Skin	28.4	2.1
Respiratory system	2.4	8.9	Brain	.4	.9
Genitourinary system	26.8	31.2	Bones	1.0	.7
Prostrate	5.2	7.8	All others	4.2	5.7
Uterus	13.0	11.2			
Others	8.6	12.2	All sites	100.0	100.0

DURATION OF REPORTED CANCER CASES

One of the items reported on the schedule was the known duration of the malignant growth. As used here, duration is computed, for cases alive at the end of the study year, from the date of first diagnosis to the end of the study year, and for cases dying during the study year, from the date of first diagnosis to the date of death. Over 60 percent of all the cases had durations of less than 12 months; only 6 percent had durations of 5 years or over.

TABLE 8.—*The percentage distribution of cancer cases of known duration by months since first diagnosis and vital status, Denver, Colo., 1939*

Months since first diagnosis	Percent in each duration group		
	Alive	Dead	Total
0–5	28.1	59.5	35.2
6–11	26.9	19.1	25.3
12–23	20.3	12.3	18.5
24–35	9.7	3.6	8.2
36–47	5.0	2.1	4.3
48–59	2.7	1.1	2.3
60–71	2.4	.8	2.1
72–83	1.2	.7	1.1
84–95	1.1		.8
96 and over	2.6	.8	2.2
All known durations	100.0	100.0	100.0

Table 8 shows the percentage of cases in each duration group separately for cases alive and for cases dead at the end of the study year. The duration of the living cases was definitely higher than that of the dead cases. About 72 percent of the living cases had histories of 6 months or longer; only about 40 percent of the dead cases had lived that long after first diagnosis.

On the basis of table 7, it might seem that the difference in duration between the living and dead cases is due entirely to the fact that the sites which are most difficult to treat occur more frequently among the dead cases. This, however, is only part of the explanation. It is apparent from table 9 that the living cases of a particular site had longer durations even when compared with the dead cases of the same site. Thus, while 30 percent of the living cases of the digestive tract had been

under medical treatment for a year or more, only 6 percent of the dead cases had been receiving care that long. Since similar, though not so marked differences are observable for every one of the sites listed in table 9, the logical inference is that the chances of survival of the cancer patient were determined not only by the primary site of the malignancy but also by the length of time which elapsed before diagnosis was made and treatment begun.

TABLE 9.—*Percentage of cases of cancer with duration of less than certain number of months since diagnosis, classified by primary site and vital condition at the end of the year, Denver, Colo., 1939*

Duration since first diagnosis of less than—	Buccal cavity		Digestive tract		Respiratory system		Genitourinary system		Breast	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
6 months	26	32	41	80	47	46	30	59	21	29
12 months	54	59	70	94	72	92	56	77	42	47
18 months	64	77	77	96	83	96	69	87	53	61
24 months	74	91	86	97	83	100	77	91	62	72
30 months	82	95	89	97	83		84	93	67	79
36 months	86	95	90	98	83		88	95	72	82
42 months	88	95	93	99	86		91	96	77	87
48 months	90	95	94	99	89		93	97	81	89
54 months	91	95	95	99	92		95	98	85	93
60 months	91	95	96	99	94		95	98	86	94

CASES UNDER OBSERVATION ONLY

Of the 2,732 cancer cases reported, 436, or 16 percent, had received no treatment for malignancy during the study year but had been kept under observation by the reporting physician or hospital to guard against possible recurrence. The durations between the dates on which the cases were last treated and January 1, 1939, the start of the study year, are presented in table 10. Twenty-six of the observed-only cases, or 6 percent, had a duration since last treatment of at least 5 years. Those cases had been diagnosed as cancer in 1933 or earlier, the treatment had been terminated by 1934, and since that time the cases had been kept under observation. Of course, except for those cases dying during the study year, the cases all have one year's duration in addition to that listed in table 10.

There are sharp differences between the distribution by primary site of these observed-only cases and that of cases which received treatment during the study year. These arise chiefly from the differences in fatality of cancer of the various sites. Table 11 shows the distributions of both groups of cases, observed and treated.

TABLE 10.—*Percentage distribution of observed-only cases by duration since last treated, and sex, Denver, Colo., 1939*

Months since last treated (up to Jan. 1, 1939)	Male	Female	Total
0–5	36 2	32.4	34 1
6–11	25 0	10.9	17 2
12–23	16.0	24.8	20 9
24–35	8.5	11 8	10.3
36–47	3.7	7 1	5.6
48–59	6.4	5.5	5 9
60–71	.5	2.9	1.9
72–83	2.1	2.5	2.3
84–95	.5	-------	.2
96 and over	1.1	2.1	1.6
All known durations	100 0	100 0	100 0

TABLE 11.—*Primary site distributions of observed-only and of treated cancer cases, Denver, Colo., 1939*

Primary site	Percentage distribution of		Percent of reported cases that were under observation only
	Observed-only cases	Treated cases	
Buccal cavity	13.6	8 6	23 0
Digestive tract	4 1	18 1	4.2
Respiratory system	1 4	2 5	9 4
Genitourinary system	22 0	26 9	13.4
Breast	19 7	14 0	21 1
Skin	35.6	22.7	23 0
Brain	2	1.0	4 0
Bones	.9	1[illegible]	11.1
All other sites	2.5	4 8	9 2
All sites	100 0	100 0	16 0

There were relatively few cases of the digestive tract, brain, and respiratory system among the observed-only cases, primarily because cases of these sites are especially fatal and have short durations. On the other hand, cases of the skin, buccal cavity, and breast were more frequent among the observed-only than among the treated cases. Cases of the genitourinary system were a larger proportion of the treated than of the observed cases, 27 as against 22 percent.

CASES ORIGINATING IN 1939

The prevalence rates presented in table 4 were based on all cases existing in the resident population of Denver in 1939, regardless of the date of onset (or first diagnosis). Hence, all cases, whether diagnosed, treated, or observed for cancer during 1939, were included in the computation of those rates. As distinguished from this, the incidence rates in table 12 relate only to cases which originated during 1939, i. e., were reported as first diagnosed during that year. They exclude all other cases even though they may have received treatment during this period.

The total number of such new cases among residents of Denver in 1939 was 905, of whom 394 were male and 511 were female. Again using the populations derived earlier in this paper, the incidence rate

of cancer in Denver is found to be 286 per 100,000. The rate for males was 256, lower than the female rate of 314.

TABLE 12.—*Percentage distribution and incidence rate per 100,000 for resident cancer cases first diagnosed in 1939, by primary site and sex, Denver, Colo., 1939*

Primary site	Percentage distribution		Rate per 100,000	
	Male	Female	Male	Female
Buccal cavity	10.4	2 9	26.7	9.2
Digestive tract	28.2	23 9	72.3	75.1
Respiratory system	5.1	1.8	13.0	5.5
Genitourinary system	23 3	29.0	59 9	91 1
Prostate	13 9		35 8	
Uterus		19 0		59 7
Other	9.4	10.0	24 1	31.4
Breast	(1)	20 5	(1)	64 6
Skin	27 4	16 6	70 3	52.3
All others [1]	5.6	5 3	14.3	16.6
All sites	100 0	100 0	256 5	314.4

[1] Brain, bone, and male breast cases are included in the "All other" group.

On comparison of table 12 with table 4, it appears that cancer of the more fatal sites was relatively more frequent among the new cases than among the total cases seen in 1939, and that the reverse was true for those sites where a large proportion of the cases were successfully treated.

SUMMARY

There were 1,601 resident cancer cases reported in Denver in 1939. In addition to these reported cases, there were 37 recorded deaths of cancer which had not been reported in the survey, making the total number of resident cases 1,638.

The cancer prevalence rate was 518.2 cases per 100,000 persons. This was the second highest rate among the surveyed areas. The rate was considerably higher for females than for males, 602.4 as compared with 429.0.

Approximately a quarter of the cases in Denver were primary skin cancer. In this report, Denver is similar to the southern study areas, in each of which large proportions of the cases were skin cancer.

There were differences between male and female cases in the frequency of the various primary sites of malignant growth. Among males, the most frequent sites reported were the skin, 32.9 percent, and the genitourinary system, 20.9 percent. For females, the most common sites were the genitourinary system, 30.5 percent, and the breast, 27.0 percent.

Ten percent of the cases reported in Denver were among persons under 40 years of age, and almost half of them among persons under 60. Because of the different primary site distributions of the male and female cases, a larger proportion of the females than of the male cases occurred among persons under 60, 53 percent as compared with 41 percent.

Cancers of the skin and prostate were found primarily among persons over 65 years of age; cancers of the breast and uterus at ages 45–64.

Cancer of certain sites proved relatively more fatal than cancer of others. Cases of the digestive tract, respiratory system, brain, and prostate composed a larger part of the recorded deaths than they did of the reported cases, whereas the reverse was true of cases of the buccal cavity, uterus, breast, and skin.

For the cases, average duration after the date of first diagnosis was extremely short. Over 60 percent of all the cases had durations of less than 12 months; only 6 percent had durations of 5 years or more.

There were 905 resident cancer cases which were first diagnosed in 1939, giving an incidence rate of 286 per 100,000. The rate for males was 256, lower than the female rate of 314 per 100,000.

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Appendix

The appendix tables, which present the absolute numbers of cases, are serialized so as to correspond with the tables in the text which are based upon them.

TABLE 2.—*The number of reported cases of cancer by nature and number of reporting sources and by sex, Denver, Colo., 1939*

Nature and number of reporting sources	Number of cases		
	Males	Females	All cases
Doctor(s) only	611	772	1,383
Hospital(s) only	433	403	836
Doctor(s) and Hospital(s)	187	326	513
1 source only	976	1,062	2,038
2 sources	175	329	504
3 or more sources	80	110	190
Any and all sources	1,231	1,501	2,732

TABLE 3.—*Number of cancer cases reported, and number with diagnosis microscopically confirmed, by primary site, and reporting source, Denver, Colo., 1939*

Primary site	Number of cases reported					
	By doctors only		By a hospital [1]		By all sources	
	With a biopsy [2]	Total	With a biopsy [2]	Total	With a biopsy [2]	Total
Buccal cavity	47	159	59	98	106	257
Digestive tract	59	137	177	296	236	433
Respiratory system	14	29	25	35	39	64
Genitourinary system	191	263	333	451	524	714
Breast	165	240	136	168	301	408
Skin	84	485	98	190	182	675
Brain	3	6	11	19	14	25
Bones	8	13	18	23	26	36
All other sites	29	51	49	69	78	120
All sites	600	1,383	906	1,349	1,506	2,732

[1] This group includes cases reported by hospitals only and cases reported by both hospitals and doctors.
[2] Biopsy is used here to mean any microscopic diagnosis.

TABLE 4.—*The number of cancer cases reported, by primary site, sex, and residence, Denver, Colo., 1939*

Primary site	Male		Female		Total	
	Resident	Nonresident	Resident	Nonresident	Male	Female
Buccal cavity	79	122	28	28	201	56
Lip	58	93	13	12	151	25
Tongue	5	4	3	4	9	7
Mouth	1	4	1	2	5	3
Jaw	4	5	2	2	9	4
Pharynx	1				1	
Others	10	16	9	8	26	17
Digestive tract	146	74	161	52	220	213
Esophagus	8	3	1	2	11	3
Stomach and duodenum	46	31	42	6	77	48
Intestines	26	10	46	11	36	57
Rectum, anus	36	21	35	23	57	58
Liver, biliary passage	9		19	3	9	22
Pancreas	16	7	12	6	23	18
Others	5	2	6	1	7	7
Respiratory system	26	24	12	2	50	14
Larynx	6	7	1		13	1
Lungs, pleura	19	15	10	1	34	11
Others	1	2	1	1	3	2
Genitourinary system	115	112	285	172	257	457
Prostate	84	56			140	
Uterus			208	127		335
Kidneys	13	11	12	6	24	18
Bladder	33	27	19	11	60	30
Others	15	18	46	28	33	74
Breast	1	2	261	144	3	405
Skin	210	195	165	105	405	270
Brain	5	9	2	9	14	11
Bones	9	14	7	6	23	13
All other sites	24	34	35	27	58	62
All sites	645	586	956	545	1,231	1,501

TABLE 5.—*Number of reported male cases of cancer, by primary site, age, and residence, Denver, Colo., 1939*

Primary site	Age								
	Under 25	25–34	35–44	45–54	55–64	65–74	75 and over	Unknown	Total
Buccal cavity:									
Resident	1	2	6	17	25	15	8	5	79
Nonresident	3	9	18	24	21	21	12	14	122
Digestive tract:									
Resident	------	1	7	21	34	52	26	5	146
Nonresident	1	1	5	11	31	20	5	---------	74
Respiratory system:									
Resident	1	2	4	3	8	4	4	---------	26
Nonresident	1	------	6	10	5	2	-------	---------	24
Genitourinary system:									
Resident	1	4	5	12	30	52	39	2	145
Nonresident	5	6	5	9	25	38	22	2	112
Prostate:									
Resident	-----	-----	-------	1	14	36	32	1	84
Nonresident	---	-----	-------	1	10	28	16	1	56
Other genitourinary:									
Resident	1	4	5	11	16	16	7	1	61
Nonresident	5	6	5	8	15	10	6	1	56
Skin:									
Resident	1	2	10	29	32	44	48	44	210
Nonresident	1	2	10	21	37	45	25	54	195
All others:[1]									
Resident	3	2	1	9	7	11	4	2	39
Nonresident	9	7	12	10	12	7	1	1	59
All sites:									
Resident	7	13	33	91	136	178	129	58	645
Nonresident	20	25	56	85	131	133	65	71	586

[1] "All others" includes the breast, brain, and bones cases, since there were too few of these to give reliable percentage.

TABLE 6.—*Number of reported female cases of cancer, by primary site, age, and residence, Denver, Colo., 1939*

Primary site	Age								
	Under 25	25–34	35–44	45–54	55–64	65–74	75 and over	Unknown	Total
Buccal cavity:									
Resident			-	4	8	8	4	4	28
Nonresident	3	2	5	2	5	7	1	3	28
Digestive tract:									
Resident	2	3	12	18	37	50	35	4	161
Nonresident	1	[illegible]	4	18	9	15	4	----	52
Respiratory system:									
Resident	--	2	1	3	4	1	------	1	12
Nonresident	1	- -	-------	1	--- -	-------	------	- ---	2
Genitourinary system:									
Resident	4	12	37	72	70	62	20	8	285
Nonresident	2	13	21	43	56	22	7	8	172
Uterus:									
Resident	1	8	27	60	51	39	14	8	208
Nonresident	- ---	10	14	35	40	17	4	7	127
Other genitourinary:									
Resident	3	4	10	12	19	23	6	-------	77
Nonresident	2	3	7	8	16	5	3	1	45
Breast:									
Resident	-------	9	39	62	64	53	22	12	261
Nonresident	-------	8	20	34	50	20	6	6	144
Skin:									
Resident	1	2	17	18	23	36	24	49	165
Nonresident	-------	-----	8	16	16	20	12	33	105
All others:[1]									
Resident	1	2	5	11	11	7	6	1	44
Nonresident	7	2	7	7	9	6	2	2	42
All sites:									
Resident	8	30	111	183	217	217	111	79	956
Nonresident	14	26	65	121	145	90	32	52	545

[1] "All others" includes the brain and bones cases, since there were too few of these to give valuable percentages.

TABLE 7.—*Number of resident reported cases and recorded deaths of cancer, by primary site, Denver, Colo., 1939*

Primary site	Reported cases	Recorded deaths	Primary site	Reported cases	Recorded deaths
Buccal cavity	99	13	Breast	262	53
Digestive tract	307	176	Skin	375	9
Respiratory system	38	17	Brain	7	4
Genitourinary system	429	136	Bones	16	3
Prostate	84	34	All others	68	25
Uterus	208	49			
Others	137	53	All sites	1,601	436

TABLE 8.—*Number of cancer cases reported, by known duration and vital status, Denver, Colo., 1939*

Months since first diagnosis	Number of cancer cases: Vital status: Alive	Dead	Unknown	Total
0–5	585	364	13	962
6–11	561	117	12	690
12–23	423	75	7	505
24–35	202	22	1	225
36–47	104	13	1	118
48–59	57	7		64
60–71	50	5	1	56
72–83	25	4		29
84–95	22			22
96 and over	55	5		60
Unknown		1		1
Total	2,084	613	35	2,732

TABLE 9.—*Number of cases of cancer, classified by the number of months since diagnosis, primary site, and vital condition at the end of the year, Denver, Colo., 1939*

Duration since first diagnosis	Buccal cavity: Alive	Buccal cavity: Dead	Digestive tract: Alive	Digestive tract: Dead	Respiratory system: Alive	Respiratory system: Dead	Genitourinary system: Alive	Genitourinary system: Dead	Breast: Alive	Breast: Dead
Under 6 months	61	7	82	175	17	12	158	104	70	21
6–11 months	65	6	59	31	9	12	138	31	67	18
12–17 months	23	4	14	6	4	1	71	19	39	10
18–23 months	22	3	17	1		1	38	6	29	8
24–29 months	19	1	6	1			39	3	17	5
30–35 months	10		3	2			21	5	15	2
36–41 months	5		5	3	1		14	1	17	4
42–47 months	3		3		1		11	2	14	1
48–53 months	3		2		1		10	1	11	8
54–59 months			2		1		5		6	1
60 months and over	21	1	8	1	2		24	4	45	4
All durations	232	22	201	220	36	26	529	176	330	72

TABLE 10.—*Number of cancer cases that were under observation only during 1939, by duration since last treatment and by sex, Denver, Colo., 1939*

Months since last treated (up to Jan. 1, 1939)	Male	Female	Total
0–5	68	77	145
6–11	47	26	73
12–23	30	59	89
24–35	16	28	44
36–47	7	17	24
48–59	12	13	25
60–71	1	7	8
72–83	4	6	10
84–95	1		1
96 and over	2	5	7
Unknown	1	9	10
Total	189	247	436

TABLE 11.—*The number of cancer cases which, during 1939, were under observation only, by months duration after treatment, and primary site, with the numbers of treated and total cases, Denver, Colo., 1939*

Months since last treated	Primary site groups									Total
	Buccal cavity	Digestive tract	Respiratory system	Genitourinary system	Breast	Skin	Brain	Bones	All other sites	
0–5	14	4	1	30	19	73	1	1	2	145
6–11	14	6	1	17	6	27		[illegible]	1	73
12–23	9			26	17	32		1	4	89
24–35	6	3	2	7	15	8		1	2	44
36–47	2	2	1	6	7	4			2	24
48–59	10			5	7	3				25
60–71	1			1	5	1				8
72–83	3	1		2	2	2				10
84–95						1				1
96 and over			1	2	2	2				7
Unknown		2			6	2				10
Total	59	18	6	96	86	155	1	4	11	436
Treated cases	198	415	58	618	322	520	24	32	109	2,296
All cases	257	433	64	714	408	675	25	36	120	2,732

TABLE 12.—*Number of resident cases of cancer first diagnosed in 1939, classified by primary site and sex, Denver, Colo., 1939*

Primary site	Male	Female	Primary site	Male	Female
Buccal cavity	41	15	Breast	1	105
Digestive tract	111	122	Skin	108	85
Respiratory system	20	9	All others [1]	21	27
Genitourinary system	92	148			
Prostate	55		All sites	394	511
Uterus		97			
Other	37	51			

[1] "All others" includes cases of brain and bone cancer.

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

November 8–December 5, 1942

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended December 5, 1942, the number reported for the corresponding period in 1941, and the median number for the years 1937–41.

DISEASES ABOVE MEDIAN PREVALENCE

Influenza.—The number of reported cases of influenza rose from 5,404 during the preceding 4 weeks to 7,147 during the 4 weeks ended December 5. The current incidence was less than 75 percent of the incidence reported during the corresponding period in 1941, but it was about 15 percent above the 1937–41 median incidence for the same weeks. Of the total number of cases Texas reported 2,384, South Carolina 1,489, and Virginia 996; approximately two-thirds of the cases occurred in those three States. Slight increases were reported from the North Atlantic and west coast regions, but in other regions the disease was slightly less prevalent than in preceding years.

The mortality data for large cities issued at the Bureau of the Census indicate unusually high death rates in some cities, part of which is probably attributable to the respiratory diseases as these diseases are important at this season of the year. For the group of cities as a whole the rates for the 4 weeks under consideration were 12.0, 12.7, 11.9, and 12.8 (excluding the deaths from the Boston fire), respectively. (See Mortality, all causes).

Measles.—The number of reported cases of measles rose from approximately 5,000 during the preceding 4-week period to approximately 10,000 during the 4 weeks ended December 5. For the country as a whole, the number of cases was about 10 percent below the 1937–41 median incidence for this period. Considering the situation by geographic regions, the New England reported an increase over the median of more than 80 percent, the Middle Atlantic region more than 50 percent, the Pacific more than 60 percent, and in the Mountain region the number of cases was more than twice the median incidence for this period. Decreases were reported from all other regions, the most significant decline occurring in the South Atlantic region where the number of cases was only about 15 percent of the 1937–41 median for these same weeks.

Meningococcus meningitis.—For the current period there were 314 cases of this disease reported, as compared with 145, 88, and 132 cases for the corresponding period in 1941, 1940, and 1939, respectively. Each section of the country contributed to the current excess over the 1937–41 median incidence, but the largest numbers of cases were reported from the Atlantic coast regions where more than 60 percent of the total cases occurred. The situation was only slightly less favorable than in preceding years in the West North Central and East South Central regions, but in other regions, while the numbers of cases were not large, they represented very definite increases over the normal seasonal level.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—For the 4 weeks ended December 5 there were 1,854 cases of diphtheria reported, as compared with 2,430 in 1941 and a median of 3,074 for the corresponding period in 1937–41. Each section of the country except the West North Central reported a relatively low incidence during this period.

Poliomyelitis.—For the country as a whole the incidence of this disease was relatively low, the 357 cases reported during the current period being only about 55 percent of the 1941 figure for the same weeks and approximately 60 percent of the 1937–41 median incidence. The only regions reporting an excess over the normal expectancy were the West South Central and Pacific regions. Texas in the West South Central region reported 62 cases, as compared with an average of 12 cases during this period in the 5 preceding years, and California reported 71 cases as compared with an average of 33 cases during the same period; other States in those regions reported about the normal seasonal incidence.

Scarlet fever.—The incidence of scarlet fever was slightly higher than it was during the corresponding 4 weeks in 1941, but the number of cases (10,463) was about 25 percent below the 1937–41 average incidence for the corresponding period. In the New England region the number of cases (1,186) represented an increase over the preceding 5-year median of about 80 percent and there was a slight increase in the South Atlantic region, but in all other regions the incidence was below the normal seasonal level.

Smallpox.—The number of cases (49) of smallpox was slightly higher than the 1941 incidence of 45 cases, which was the lowest on record for this period, but it was only about 25 percent of the preceding 5-year median. Increases over last year were reported from the West North Central, South Central, and Mountain regions, but in each region the incidence was below the 1937–41 median level.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period November 18–December 5, 1942, the number for the corresponding period in 1941, and the median number of cases reported for the corresponding period 1937–41

Division	Current period	1941	5-year median	Current period	1941	5-year median	Current period	1941	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	1,854	2,430	3,074	7,147	9,627	6,313	10,851	9,986	10,095
New England	17	27	48	36	6	16	2,360	1,296	1,296
Middle Atlantic	144	125	323	113	52	74	2,743	1,787	1,787
East North Central	242	314	450	232	305	285	880	1,064	1,064
West North Central	164	120	152	77	95	95	570	620	648
South Atlantic	591	779	946	2,681	2,121	1,774	180	2,096	1,132
East South Central	198	338	398	275	399	468	153	310	310
West South Central	297	502	502	2,845	5,685	1,402	98	591	231
Mountain	79	132	123	659	605	605	1,540	784	637
Pacific	122	93	143	229	359	199	2,327	1,438	1,438
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	314	145	135	357	635	576	10,463	10,289	13,626
New England	49	19	9	7	26	10	1,186	946	654
Middle Atlantic	91	47	29	42	155	48	1,651	1,814	2,247
East North Central	33	22	15	54	127	72	2,864	2,764	4,428
West North Central	8	5	7	49	39	49	1,097	1,105	1,746
South Atlantic	53	17	26	20	75	43	1,439	1,447	1,378
East South Central	20	15	19	21	139	35	785	879	849
West South Central	18	9	9	62	23	27	362	413	458
Mountain	11	4	7	20	20	20	330	341	471
Pacific	31	7	7	82	31	36	749	580	895
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	49	45	198	341	591	735	13,359	14,261	[3] 14,727
New England	0	0	0	10	12	14	1,876	1,287	1,314
Middle Atlantic	0	0	0	50	144	104	4,161	3,711	4,333
East North Central	21	11	59	37	66	77	3,279	4,212	3,537
West North Central	10	14	95	30	31	48	523	743	595
South Atlantic	1	6	3	75	117	117	1,186	1,420	1,460
East South Central	4	1	11	45	76	76	371	538	534
West South Central	6	3	22	48	107	159	688	495	401
Mountain	4	2	9	29	[illegible]	44	257	658	487
Pacific	3	8	22	17	15	42	1,018	1,197	929

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.
[2] Mississippi excluded.
[3] 4 years (1938–41) only

Typhoid and paratyphoid fever.—The incidence of this disease was also comparatively low, the number of cases (341) reported for the current 4 weeks being less than 60 percent of the number reported during this period in 1941, and less than 50 percent of the median incidence (735 cases) for the same weeks. Each section of the country, with the possible exception of the New England, has shared in the favorable situation of this disease that has existed throughout the current year.

Whooping cough.—For the country as a whole, the number of cases (13,359) of whooping cough was about 10 percent below the expected seasonal level (approximately 14,700 cases). Excesses over the 1937–41 median incidence were reported from the New England, West South Central, and Pacific regions, but in all other regions the incidence was relatively low.

MORTALITY, ALL CAUSES

Deaths from all causes in large cities, as reported by the Bureau of the Census, rose from 11.9 for the preceding 4-week period to 13.5 for the 4 weeks ended December 5. Part of this increase was due to 476 deaths from fire in a Boston night club. The average rate for the 4 weeks under consideration was 12.5 per 1,000 population (annual basis), as compared with an average rate of 11.6 for the corresponding period in 1939–41. Exclusive of the deaths from the fire the average rate for the same weeks was 12.4 per 1,000, which figure represents an increase of approximately 7 percent over the preceding years. As the respiratory diseases are normally the most prevalent diseases at this season of the year, it seems probable that they are mostly responsible for the increase in the mortality rate.

INCIDENCE OF HOSPITALIZATION, OCTOBER AND NOVEMBER 1942

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 8,000,000 members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service. The data cover about 60 hospital service plans scattered throughout the country, mostly in large cities.

Item	October	
	1942	1941
1. Number of plans supplying data	61	55
2. Number of persons eligible for hospital care	9,067,776	6,845,604
3. Number of persons admitted for hospital care	81,908	60,182
4. Incidence per 1,000 persons, annual rate, during current month (daily rate ×365)	106.4	103.4
5. Simple average of annual rates for the 12 months ended Oct. 31	107.8	
	November	
	1942	1941
1. Number of plans supplying data	60	57
2. Number of persons eligible for hospital care	8,308,004	7,257,888
3. Number of persons admitted for hospital care	67,905	57,165
4. Incidence per 1,000 persons, annual rate, during current month (daily rate ×365)	99.3	95.7
5. Simple average of annual rates for the twelve months ended Nov. 30	108.1	

DEATHS DURING WEEK ENDED DECEMBER 12, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Dec. 12, 1942	Corresponding week 1941
Data from 87 large cities of the United States:		
Total deaths	9,267	8,891
Average for 3 prior years	8,466	
Total deaths, first 49 weeks of year	410,659	406,877
Deaths per 1,000 population, first 49 weeks of year, annual rate	11.8	11.6
Deaths under 1 year of age	718	561
Average for 3 prior years	525	
Deaths under 1 year of age, first 49 weeks of year	28,472	25,852
Data from industrial insurance companies:		
Policies in force	65,287,158	64,219,667
Number of death claims	12,420	10,756
Death claims per 1,000 policies in force, annual rate	9.9	8.7
Death claims per 1,000 policies, first 49 weeks of year, annual rate	9.1	9.4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED DECEMBER 19, 1942

Summary

Only minor increases were recorded for the current week in the incidence of any of the nine communicable diseases included in the following table, and reports of only two, meningococcus meningitis and poliomyelitis, were above the median numbers for the corresponding week of the years 1937–41.

Reports of influenza declined from 2,604 cases to 2,414. Of the current total 873 cases were reported in Texas, 460 in South Carolina, and 233 in Virginia, aggregating 1,566 cases, or 65 percent of the total.

A total of 103 cases of meningococcus meningitis was reported, the same number as for the preceding week, and the greatest number for the corresponding week of any year since 1936. The corresponding median number is 40. The greatest numbers were reported in New York, 17 (14 in New York City), Pennsylvania and Virginia, 7 each; 6 each in Massachusetts, New Jersey, Illinois, Maryland, and California, and 5 cases in Maine.

Reports of measles for the week increased from 4,285 to 4,766. The corresponding 5-year median number is 4,816. The greatest numbers reported for the current week were: Pennsylvania, 867 cases; New York, 660; Utah, 510; Washington, 440.

The incidence of poliomyelitis decreased from 66 cases to 61 for the current week. The corresponding 5-year median figure is 48. Of the total for the current week, 26 cases were reported in Texas and 9 in California. No other State reported more than 3 cases.

The total number of typhus fever cases reported for the week was 76, 26 of which were in Texas, 25 in Georgia, and 11 in Alabama.

Other reports for the week include 2 cases of anthrax in Massachusetts and Delaware; 176 cases of dysentery, 14 of which were amebic, 124 bacillary, and 38 unspecified; 5 cases of infectious encephalitis; 1 case of leprosy (in Louisiana), 14 of smallpox, and 27 of tularemia.

The death rate for the current week in 88 large cities in the United States is 13.2 per 1,000 population, as compared with 13.0 for the preceding week and a 3-year (1939–41) average of 12.1.

Telegraphic morbidity reports from State health officers for the week ended December 19, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41	Week ended		Median 1937-41
	Dec. 19, 1942	Dec. 20, 1941		Dec. 19, 1942	Dec. 20, 1941		Dec. 19, 1942	Dec. 20, 1941		Dec. 19, 1942	Dec. 20, 1941	
NEW ENG.												
Maine	0	1	2	------	------	------	13	174	42	5	1	1
New Hampshire	0	0	0	------	------	------	13	6	4	0	0	0
Vermont	0	0	0	------	------	------	129	3	21	0	0	0
Massachusetts	2	4	5	------	------	------	328	167	212	6	2	1
Rhode Island	1	1	1	1	1	------	1	21	1	0	0	0
Connecticut	0	0	1	3	1	1	329	61	60	2	0	0
MID. ATL.												
New York	21	22	22	[1] 12	[1] 6	[1] 14	660	294	425	17	3	4
New Jersey	3	7	9	9	13	11	40	51	51	6	1	1
Pennsylvania	9	9	27	2	------	------	867	678	678	7	5	3
E. NO. CEN.												
Ohio	15	16	16	9	17	12	52	108	42	0	1	2
Indiana	3	7	17	15	20	26	21	11	11	1	0	0
Illinois	22	45	44	10	11	14	83	64	64	6	0	0
Michigan [2]	3	8	10	31	2	2	51	59	305	2	0	1
Wisconsin	2	0	0	49	22	44	227	142	142	3	1	0
W. NO. CEN.												
Minnesota	2	4	1	1	2	1	8	72	72	0	1	0
Iowa	3	0	4	------	1	7	46	69	69	0	0	0
Missouri	4	5	11	4	2	6	6	13	13	3	1	1
North Dakota	1	0	1	12	4	18	2	115	12	0	0	0
South Dakota	1	4	4	------	------	------	52	7	7	0	0	0
Nebraska	4	2	2	31	2	------	60	14	8	1	0	0
Kansas	9	9	7	3	15	15	71	109	70	0	1	1
SO. ATL.												
Delaware	0	0	0	------	------	------	0	1	2	1	0	0
Maryland [2]	9	13	12	5	3	9	11	144	5	6	0	0
Dist. of Col.	0	0	4	3	------	------	2	5	5	2	1	0
Virginia	11	14	24	233	152	152	7	86	41	7	0	1
West Virginia	11	6	15	34	18	18	2	135	25	3	0	2
North Carolina	17	38	38	------	11	11	2	257	270	2	0	0
South Carolina	4	6	6	460	421	421	0	24	21	0	0	1
Georgia	14	18	14	59	50	77	9	75	18	0	0	0
Florida	8	10	7	4	0	9	4	57	18	0	1	0
E. SO. CEN.												
Kentucky	12	5	14	5	4	24	29	12	12	0	0	2
Tennessee	8	11	11	40	28	47	23	67	56	0	3	3
Alabama	8	23	23	40	66	222	2	20	20	0	0	1
Mississippi [2]	15	10	10	------	------	------	------	------	------	0	3	1
W. SO. CEN.												
Arkansas	18	11	15	90	97	134	22	68	25	0	0	1
Louisiana	9	10	14	2	3	10	3	11	3	1	1	1
Oklahoma	9	6	15	30	97	98	23	11	10	1	0	0
Texas	38	64	50	873	1,320	499	5	270	36	4	1	1
MOUNTAIN												
Montana	3	1	0	------	9	9	75	80	3	0	0	0
Idaho	0	2	0	------	------	3	25	2	11	0	0	0
Wyoming	0	1	0	148	4	4	23	14	8	1	0	0
Colorado	18	18	7	54	36	36	12	420	61	1	0	0
New Mexico	3	0	5	------	------	------	0	10	21	2	0	0
Arizona	1	0	2	73	126	126	7	33	5	0	0	0
Utah [2]	1	0	0	1	2	33	510	19	19	0	0	0
Nevada	0	0	------	------	------	------	105	0	------	0	0	------
PACIFIC												
Washington	7	8	1	------	8	1	440	4	160	4	0	1
Oregon	2	0	2	16	13	31	285	45	17	3	0	0
California	19	15	28	52	102	34	81	500	120	6	1	3
Total	350	424	593	2,414	2,693	2,693	4,776	4,608	4,816	103	28	40
50 weeks	14,993	16,268	23,064	103,437	517,566	264,194	496,064	856,638	370,015	3,490	1,955	1,955

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended December 19, 1942, and comparison with corresponding week of 1941 and 5-year median—Continued

Division and State	Poliomyelitis: Week ended Dec. 19, 1942	Poliomyelitis: Week ended Dec. 20, 1941	Poliomyelitis: Median 1937–41	Scarlet fever: Week ended Dec. 19, 1942	Scarlet fever: Week ended Dec. 20, 1941	Scarlet fever: Median 1937–41	Smallpox: Week ended Dec. 19, 1942	Smallpox: Week ended Dec. 20, 1941	Smallpox: Median 1937–41	Typhoid and paratyphoid fever: Week ended Dec. 19, 1942	Typhoid and paratyphoid fever: Week ended Dec. 20, 1941	Typhoid and paratyphoid fever: Median 1937–41
NEW ENG.												
Maine	0	1	0	10	32	24	0	0	0	1	3	2
New Hampshire	0	2	0	3	16	6	0	0	0	0	0	0
Vermont	1	1	0	2	1	4	0	0	0	0	0	0
Massachusetts	1	1	0	267	259	145	0	0	0	5	3	1
Rhode Island	0	0	0	7	5	10	0	0	0	0	1	0
Connecticut	0	0	0	40	23	63	0	0	0	4	0	1
MID ATL.												
New York	2	7	1	301	297	379	0	0	0	4	6	6
New Jersey	0	1	1	57	92	94	0	0	0	1	0	1
Pennsylvania	0	1	1	194	245	286	0	0	0	5	6	7
E. NO. CEN.												
Ohio	0	1	1	269	268	268	0	0	1	2	2	3
Indiana	0	0	0	29	45	138	1	0	4	0	1	1
Illinois	1	6	1	164	236	346	4	1	6	3	2	4
Michigan [2]	1	0	0	78	155	296	0	1	1	3	3	3
Wisconsin	0	1	1	174	153	153	0	0	5	0	1	0
W. NO. CEN.												
Minnesota	1	1	2	67	76	111	0	0	17	0	0	0
Iowa	0	0	1	45	56	92	1	0	6	3	1	1
Missouri	0	0	0	52	35	79	0	4	2	1	3	5
North Dakota	0	0	0	13	13	24	0	0	1	0	0	0
South Dakota	1	0	0	29	25	31	0	2	2	0	0	0
Nebraska	1	0	0	10	25	27	1	0	1	0	0	0
Kansas	2	0	0	70	85	103	1	0	0	0	0	0
SO. ATL.												
Delaware	0	0	0	5	19	16	0	0	0	0	0	0
Maryland [2]	0	2	1	37	43	51	0	0	0	1	8	3
Dist. of Col.	0	0	0	14	22	12	0	0	0	1	1	1
Virginia	0	1	1	37	38	44	0	0	0	4	5	3
West Virginia	1	1	1	42	67	67	1	0	0	0	3	2
North Carolina	2	0	0	67	72	72	1	0	0	3	0	2
South Carolina	1	0	0	9	5	12	1	0	0	0	2	1
Georgia	0	1	1	16	23	23	0	0	0	1	1	6
Florida	3	0	0	12	10	6	0	0	0	1	2	2
E. SO. CEN.												
Kentucky	0	0	0	52	85	76	0	1	1	9	3	2
Tennessee	1	2	0	37	49	58	0	2	1	1	2	1
Alabama	0	11	1	23	35	25	0	0	0	0	2	1
Mississippi [2]	1	0	0	8	24	21	1	1	0	2	1	1
W. SO. CEN.												
Arkansas	0	3	1	5	16	20	0	0	1	0	3	3
Louisiana	0	1	1	3	8	20	0	0	0	1	1	12
Oklahoma	0	0	1	13	17	24	0	0	2	1	1	1
Texas	26	3	1	55	48	48	2	5	5	6	7	13
MOUNTAIN												
Montana	0	1	0	12	38	31	0	0	2	0	1	1
Idaho	0	0	0	10	7	11	0	0	0	0	0	0
Wyoming	0	0	0	25	1	9	0	0	0	0	0	0
Colorado	0	0	0	35	29	28	0	0	5	1	0	0
New Mexico	0	0	0	4	6	15	0	0	0	3	0	3
Arizona	2	0	0	3	5	5	0	0	0	0	1	0
Utah [2]	0	0	0	49	9	26	0	0	0	0	0	0
Nevada	0	0	------	0	0	------	0	0	------	0	0	------
PACIFIC												
Washington	3	1	0	21	44	41	0	2	2	1	3	0
Oregon	0	2	1	16	10	22	0	0	0	0	2	1
California	9	3	3	136	107	168	0	0	2	4	8	8
Total	60	55	48	2,627	2,979	3,829	14	19	66	72	89	125
50 weeks	4,107	9,012	9,012	121,465	122,162	155,043	764	1,314	9,346	6,603	8,217	12,541

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended December 19, 1942—Continued

Division and State	Whooping cough, Week ended Dec. 19, 1942	Whooping cough, Week ended Dec. 20, 1941	Week ended Dec. 19, 1942: Anthrax	Dysentery: Amebic	Dysentery: Bacillary	Dysentery: Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	39	26	0	0	0	0	0	0	0	0	0
New Hampshire	8	9	0	0	0	0	0	0	0	0	0
Vermont	41	23	0	0	0	0	0	0	0	0	0
Massachusetts	308	206	1	0	0	0	0	0	0	0	0
Rhode Island	0	59	0	0	0	0	0	0	0	0	0
Connecticut	80	43	0	0	1	0	0	0	0	0	0
MID. ATL.											
New York	410	504	0	3	17	0	0	0	0	0	1
New Jersey	152	176	0	0	0	0	0	0	0	0	0
Pennsylvania	323	228	0	0	0	0	0	0	0	1	0
E. NO. CEN.											
Ohio	205	205	0	0	0	0	0	0	0	4	0
Indiana	16	13	0	0	0	0	0	0	0	3	0
Illinois	162	221	0	0	4	0	1	0	0	2	0
Michigan [2]	232	209	0	0	2	0	0	0	0	0	0
Wisconsin	297	282	0	0	0	0	0	0	0	1	0
W. NO. CEN.											
Minnesota	72	47	0	0	0	0	0	0	0	0	0
Iowa	27	9	0	0	0	0	0	0	0	0	0
Missouri	10	12	0	0	0	0	0	0	0	0	0
North Dakota	15	3	0	0	0	0	0	0	0	0	0
South Dakota	3	2	0	0	0	0	0	0	0	0	0
Nebraska	12	0	0	0	0	0	0	0	0	0	0
Kansas	41	39	0	0	0	0	0	0	0	1	0
SO. ATL.											
Delaware	6	0	1	0	0	0	0	0	0	0	0
Maryland [2]	79	20	0	0	0	9	0	0	0	3	0
Dist. of Col	14	16	0	0	0	0	0	0	0	0	0
Virginia	43	30	0	1	0	7	0	0	0	2	0
West Virginia	5	14	0	0	0	0	0	0	0	0	0
North Carolina	28	85	0	0	0	0	0	0	0	0	1
South Carolina	29	46	0	0	0	0	0	0	0	0	3
Georgia	6	10	0	0	4	0	0	0	0	1	25
Florida	2	12	0	1	19	0	0	0	0	0	3
E. SO. CEN.											
Kentucky	23	52	0	0	0	0	0	0	0	2	0
Tennessee	35	19	0	0	0	2	0	0	0	3	1
Alabama	126	6	0	0	0	0	0	0	0	0	11
Mississippi [2]	------	------	0	0	0	0	0	0	0	0	2
W. SO. CEN.											
Arkansas	18	8	0	2	0	0	0	0	0	0	0
Louisiana	5	5	0	3	0	0	0	1	0	0	2
Oklahoma	5	3	0	0	0	0	0	0	0	0	0
Texas	145	121	0	1	69	0	0	0	0	0	26
MOUNTAIN											
Montana	10	25	0	0	0	0	0	0	0	0	0
Idaho	3	30	0	0	0	0	0	0	0	0	0
Wyoming	3	3	0	0	0	0	0	0	0	2	0
Colorado	14	35	0	0	0	0	1	0	0	0	0
New Mexico	8	11	0	0	0	0	0	0	0	0	0
Arizona	1	23	0	0	0	20	0	0	0	0	0
Utah [2]	27	24	0	0	0	0	0	0	0	3	0
Nevada	0	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	32	104	0	1	0	0	0	0	0	0	0
Oregon	2	21	0	0	0	0	0	0	0	0	0
California	203	137	0	2	8	0	3	0	0	0	1
Total	3,320	3,176	2	14	124	38	5	1	0	28	76
50 weeks	172,789	202,481									

[1] New York City only.
[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended December 5, 1942

This table lists the reports from 86 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Atlanta, Ga	0	0	23	1	0	0	6	0	10	0	0	1
Baltimore, Md	0	0	2	1	3	3	13	0	12	0	0	90
Barre, Vt	0	0	------	0	47	0	0	0	0	0	0	0
Billings, Mont	0	0	------	0	0	0	1	0	0	0	0	0
Birmingham, Ala	2	0	------	0	0	0	2	0	2	0	0	1
Boise, Idaho	0	0	------	0	0	0	0	0	0	0	0	0
Boston, Mass	0	0	------	1	21	3	10	0	76	0	0	65
Bridgeport, Conn	0	0	1	1	0	0	2	0	4	0	0	2
Brunswick, Ga	0	0	------	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	1	0	1	0	38	0	5	0	3	0	1	34
Camden, N. J	1	0	------	0	2	0	0	0	3	0	0	9
Charleston, S. C	1	0	8	0	0	0	2	0	1	0	0	0
Chicago, Ill	9	0	2	0	17	1	30	0	65	0	0	76
Cincinnati, Ohio	0	0	------	1	10	1	5	0	19	0	0	4
Cleveland, Ohio	3	0	5	0	2	0	7	0	43	0	0	60
Columbus, Ohio	2	0	------	0	0	0	3	0	22	0	0	5
Concord, N. H	0	0	------	0	2	0	0	0	3	0	0	0
Cumberland, Md	0	0	------	0	0	0	1	0	1	0	0	0
Dallas, Tex	3	0	------	0	0	0	5	0	4	0	0	11
Denver, Colo	4	0	17	0	6	1	11	0	6	0	1	2
Detroit, Mich	6	0	------	1	9	0	13	0	27	0	1	137
Duluth, Minn	0	0	------	0	0	0	2	0	2	0	0	3
Fall River, Mass	0	0	------	0	0	0	2	0	3	0	0	9
Fargo, N. Dak	0	0	------	0	0	0	0	0	2	0	0	4
Flint, Mich	0	0	------	0	2	0	4	0	7	0	0	11
Fort Wayne, Ind	0	0	------	0	0	0	5	0	0	0	0	0
Frederick, Md	0	0	------	0	0	0	0	0	0	0	0	0
Galveston, Tex	0	0	------	0	0	0	2	0	2	0	0	0
Grand Rapids, Mich	0	0	1	0	1	0	2	0	0	0	0	9
Great Falls, Mont	0	0	------	0	1	0	0	0	1	0	0	3
Hartford, Conn	0	0	1	0	0	0	1	0	2	0	0	8
Helena, Mont	0	0	------	0	0	0	0	0	0	0	0	0
Houston, Tex	0	0	------	0	0	0	2	0	3	0	1	2
Indianapolis, Ind	2	0	------	0	7	0	8	0	16	0	0	10
Kansas City, Mo	1	0	------	0	2	0	1	1	25	0	0	9
Kenosha, Wis	0	0	------	0	1	0	0	0	2	0	0	2
Little Rock, Ark	0	0	1	0	0	0	6	0	1	0	0	0
Los Angeles, Calif	1	0	10	0	7	1	17	9	28	0	2	27
Lynchburg, Va	1	0	------	0	0	0	0	0	2	0	0	0
Memphis, Tenn	0	0	11	2	1	0	6	0	9	0	1	23
Milwaukee, Wis	0	0	------	0	55	0	4	0	25	0	0	26
Minneapolis, Minn	2	0	------	1	2	0	1	0	27	0	0	9
Missoula, Mont	0	0	------	0	0	0	1	0	0	0	0	0
Mobile, Ala	3	0	4	4	0	0	0	0	2	0	0	0
Nashville, Tenn	0	0	------	0	0	0	3	0	4	0	0	0
Newark, N. J	0	0	1	0	1	2	5	1	7	0	0	8
New Haven, Conn	0	0	------	0	0	0	2	0	2	0	0	15
New Orleans, La	1	0	2	2	2	2	8	0	7	0	2	6
New York, N. Y	16	2	11	3	7	11	54	2	117	0	5	115
Omaha, Nebr	2	0	------	0	0	0	4	0	5	0	0	0
Philadelphia, Pa	1	0	6	2	540	5	32	1	51	0	0	137
Pittsburgh, Pa	1	0	2	0	1	0	8	0	7	0	0	8
Portland, Maine	1	0	------	0	0	2	2	0	0	0	0	32
Providence, R. I	1	0	------	1	0	2	2	0	1	0	1	29
Pueblo, Colo	0	0	------	0	0	0	1	0	1	0	0	0
Racine, Wis	0	0	------	0	4	0	0	0	7	0	0	1
Raleigh, N. C	1	0	------	0	0	0	2	0	3	0	0	6
Reading, Pa	0	0	1	0	1	0	2	0	1	0	0	9
Richmond, Va	1	0	------	0	0	0	2	1	4	0	1	5

City reports for week ended December 5, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza Cases	Influenza Deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Roanoke, Va.	0	0	------	0	0	0	1	0	0	0	0	0
Rochester, N. Y.	0	0	------	0	4	0	8	0	7	0	0	19
Sacramento, Calif.	4	0	------	0	1	1	5	0	2	0	1	5
Saint Louis, Mo.	1	0	------	1	1	1	12	0	9	0	0	0
Saint Paul, Minn.	0	0	------	0	0	0	4	0	4	0	0	22
San Antonio, Tex.	1	0	------	0	0	0	9	1	0	0	0	1
San Francisco, Calif.	0	0	1	1	11	1	9	0	8	0	0	16
Savannah, Ga.	11	0	3	2	0	0	2	0	0	0	0	1
Seattle, Wash.	0	0	------	0	8	0	3	0	0	0	0	13
Shreveport, La.	0	0	------	0	0	0	4	0	1	0	0	0
South Bend, Ind.	0	0	------	0	0	0	0	0	0	0	0	3
Spokane, Wash.	0	0	------	0	40	0	3	0	2	0	0	1
Springfield, Ill.	0	0	------	0	0	0	3	0	10	0	0	23
Springfield, Mass.	0	0	------	0	1	0	2	0	66	0	0	0
Superior, Wis.	0	0	------	0	1	0	0	0	1	0	0	2
Syracuse, N. Y.	0	0	------	1	0	1	3	0	5	0	0	30
Tacoma, Wash.	0	0	------	0	107	0	0	0	1	0	0	0
Tampa, Fla.	0	0	------	0	0	0	2	0	1	0	0	0
Topeka, Kans.	0	0	------	0	1	0	2	0	3	0	1	1
Trenton, N. J.	0	0	3	0	0	1	2	0	6	0	0	3
Washington, D. C.	1	0	2	0	4	1	7	0	33	0	1	13
Wheeling, W. Va.	0	0	------	0	1	0	0	0	1	0	0	1
Wichita, Kans.	0	0	------	0	4	0	4	1	6	0	0	5
Wilmington, Del.	0	0	------	0	1	0	0	0	3	0	0	0
Wilmington, N. C.	1	0	------	0	0	0	2	0	2	0	0	4
Winston-Salem, N. C.	0	0	------	0	0	0	0	0	0	0	0	3
Worcester, Mass.	0	0	------	0	1	0	8	0	14	0	0	8

Anthrax.—Cases: Philadelphia, 2.
Dysentery, amebic.—Cases: Los Angeles, 1; New York, 2.
Dysentery, bacillary.—Cases: Baltimore, 1; Buffalo, 6; Detroit, 7, Los Angeles, 3; New York, 5; Rochester, 1; St. Louis, 1; San Francisco, 1.
Typhus fever.—Cases: Atlanta, 1; Galveston, 1; Little Rock, 1; Mobile, 1; Nashville, 3; New Orleans, 1; Savannah, 1; Wilmington, N. C., 2.

Rates (annual basis) per 100,000 population, for the group of 86 cities in the preceding table (estimated population, 1942, 33,774,080)

Period	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
Week ended Dec. 5, 1942	13.28	18.37	4.01	150.99	62.06	133.08	0.00	2.93	183.72
Average for week 1937–41	20.28	26.21	[1] 4.51	[2] 137.61	[1] 55.91	137.77	1.56	3.90	181.14

[1] 3-year average, 1939–41.
[2] 5-year median.

PLAGUE INFECTION IN CALIFORNIA

Plague infection has been reported proved in pools of fleas from rats and ground squirrels and in tissue from meadow mice collected in California and received at the laboratory as follows:

Alameda County.—October 14, 15, and 16, from Oakland Districts: 14 fleas from 10 rats, 5 fleas from 7 rats, 1 flea from 3 rats, and 11 fleas from 7 rats.

Modoc County.—May 22, 59 fleas from 72 ground squirrels, *C. oregonus*, taken one-half mile south and 1 mile west of Gamby.

San Luis Obispo County.—October 7, in tissue from 5 meadow mice, *Microtus* sp., taken from Camp San Luis Obispo, 5 miles northwest of San Luis Obispo.

PLAGUE INFECTION IN TACOMA, WASH.

Under dates of December 10 and 11, 1942, plague infection was reported proved in tissue from a rat, *R. norvegicus*, and in 2 pools of tissue from 94 rats and 7 rats, respectively, all of the same species, and all collected on December 1, 1942, in Tacoma, Wash.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—During the week ended November 28, 1942, 30 rats proved positive for plague were reported in Hawaii Territory. Two of these rats were found in Kapulena area, the remainder was found in Paauhau area, all in Hamakua District, Island of Hawaii.

FOREIGN REPORTS

BRITISH EAST AFRICA

Tanganyika Territory—Cerebrospinal meningitis.—Cerebrospinal meningitis has been reported in Tanganyika Territory as follows: Week ended October 31, 1942, 2,107 cases with 216 deaths including 1,895 cases reported in Lake Province; week ended November 7, 1942, 1,270 cases with 236 deaths including 957 cases in Lake Province; week ended October 24, 1942, 261 cases with 22 deaths were reported in Tanganyika Territory.

CANADA

Provinces—Communicable diseases—Week ended November 21, 1942.—During the week ended November 21, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				2	1				1	4
Chickenpox		9	1	290	366	61	88	21	44	880
Diphtheria		12	11	35	2	8			2	70
Dysentery				4		1	1			6
German measles		1		5	15			1	7	29
Influenza		10			2	6			9	27
Lethargic encephalitis							1			1
Measles		2		72	101	10	24	3	13	225
Mumps	1	29		188	472	42	54	16	207	1,009
Pneumonia		26			15	1			20	62
Poliomyelitis		1		1	1	1				4
Scarlet fever		5	17	157	132	11	19	36	52	429
Tuberculosis	3	6	6	195	66	13	21	4	17	331
Typhoid and paratyphoid fever		1		12	5					18
Undulant fever					1					1
Whooping cough		7		277	128	35	3	44	15	509
Other communicable diseases		10		3	242	67		4	9	335

JAMAICA

Notifiable diseases—4 weeks ended November 21, 1942.—During the 4 weeks ended November 21, 1942, cases of certain notifiable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		1	Leprosy		2
Chickenpox	2	3	Puerperal fever		2
Diphtheria	2	1	Tuberculosis	25	66
Dysentery	2		Typhoid fever	6	43
Erysipelas	1		Typhus fever	3	

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January-September 1942	October 1942	November 1942—week ended— 7	14	21	28
ASIA							
Ceylon	C	102					
China:							
Kunming (Yunnanfu)	C	[1] 804					
Shanghai	C	1					
India	C	81,244	5,354				
Calcutta	C	2,055	89				
Chittagong	C	55					
Rangoon	C	1					
India (French)	C	10					

[1] For the period May 12 to July 4, 1942.

PLAGUE

[C indicates cases; P, present]

Place		January-September 1942	October 1942	November 1942—week ended— 7	14	21	28
AFRICA							
Basutoland	C	10					
Belgian Congo	C	4					
British East Africa:							
Kenya	C	682	21	11	5		
Nairobi	C	64					
Uganda	C	321	17	3			
Egypt: Port Said	C	3					
Madagascar	C	92					
Morocco	C	325	24				
Senegal	C	[1] 6					
Union of South Africa	C	68					
ASIA							
China.[2]							
India	C	837	17				
Indochina (French)	C	73	4		1		
Palestine:		5					
Haifa	C						
Jaffa	C				1		
EUROPE							
Portugal: Azores Islands	C	1					
NORTH AMERICA							
Canada: Alberta Province—Plague-infected fleas		P					
SOUTH AMERICA							
Argentina: Cordoba Province	C	25	1				
Brazil:							
Alagoas State	C	3					
Pernambuco State	C	6					
Chile: Valparaiso	C	1					
Peru:							
Ancash Department	C	6					
Lambayeque Department	C	3					
Libertad Department	C	7					
Salaverry—Plague-infected rats		P					
Lima Department	C	53	2				
Lima	C	18					
Piura Department	C	15					
OCEANIA							
Hawaii Territory: Plague-infected rats		44	9		26		30
New Caledonia	C	[3] 1			1		

[1] Includes 4 suspected cases.
[2] Plague has been reported in China as follows: Chekiang Province, Apr. 1-10, 1942, 4 cases; Fukien Province, Jan. 1-Apr. 5, 1942, plague appeared in 11 localities; Hunan Province, week ended Apr. 18, 1942, 2 cases; Suiyuan Province, pneumonic plague appeared in epidemic form during the period Jan. 1-Apr. 4, 1942, in the northwestern area.
[3] Pneumonic.

SMALLPOX

[C indicates cases]

Place		January-September 1942	October 1942	November 1942—week ended— 7	14	21	28
AFRICA							
Algeria	C	687					
Belgian Congo	C	321					
British East Africa: Tanganyika	C	33	17				
Dahomey	C	56					
French Guinea	C	134					
Gold Coast	C	1,203	21				
Ivory Coast	C	50			21		
Morocco	C	1,388	148				
Nigeria	C	1,761	324	41			
Niger Territory	C	984					
Portuguese East Africa	C	47					
Rhodesia (Southern)	C	1					
Senegal	C	17					
Sudan (French)	C	274	22				
Tunisia	C	1					
Union of South Africa	C	823	8				
Zanzibar	C	[1] 2					
ASIA							
Ceylon	C	7					
China	C	9					
India	C	22,380					
Indochina (French)	C	3,162	161		42		
Iran	C	54					
Iraq	C	226		1			
Syria and Lebanon	C	[3] 175	315				
Trans-Jordan	C	2					
EUROPE							
France:							
Seine Department	C	44					
Unoccupied zone	C	13					
Great Britain:							
England and Wales	C	5					
Scotland	C	53	12	8			
Portugal	C	48	4		1		
Spain	C	204	3				
Turkey	C	328	236				[4] 285
NORTH AMERICA							
Canada	C	4	1				
Guatemala	C	[2] 6					
Mexico	C	104	6	1			
Panama Canal Zone	C	[5] 1					
SOUTH AMERICA							
Brazil	C	1					
Colombia	C	528					
Peru	C	[6] 1,147					
Venezuela (alastrim)	C	145	1				

[1] Imported. [2] For September. [3] For August and September. [4] For November.
[5] In the Canal Zone only. [6] For January to June.

TYPHUS FEVER

[C indicates cases]

Place		January-September 1942	October 1942	November 1942—week ended— 7	14	21	28
AFRICA							
Algeria	C	34,913					
Basutoland	C	32					
British East Africa: Kenya	C	18					
Egypt	C	22,653	171	42			
Ivory Coast	C	4					
Morocco	C	25,666	138				
Nigeria	C	5					
Niger Territory	C	1					
Rhodesia (Northern)	C	1					
Senegal	C	[1] 3					
Sierra Leone	C	7					
Tunisia	C	16,152	143				
Union of South Africa	C	614					

[1] Suspected.

TYPHUS FEVER—Continued

Place		January-September 1942	October 1942	November 1942—week ended—			
				7	14	21	28
ASIA							
China	C	217					
India	C	7	2				
Iran	C	795					[1] 51
Iraq	C	94	1				
Palestine	C	82	83				
Syria	C	22					
Trans-Jordan	C	5					
EUROPE							
Bulgaria	C	647			1		
Czechoslovakia	C	5					
France:							
Seine Department	C	1					
Unoccupied zone	C	229					
Germany	C	1,817					
Hungary	C	741	16	2		9	
Irish Free State	C	15	4			8	
Portugal	C	1					
Rumania	C	3,436	76			[2] 65	
Spain	C	3,870					
Canary Islands	C	1					
Switzerland	C	3					
Turkey	C	333	17				[1] 36
Union of Soviet Socialist Republics	C	67					
NORTH AMERICA							
Guatemala	C	132	56				
Jamaica	C	47			1	2	
Mexico	C	553	30	1			
Panama Canal Zone	C	1					
Puerto Rico	C	3					
SOUTH AMERICA							
Chile	C	107					
Colombia	C	4					
Ecuador	C	109	28	2	5	4	
Peru	C	923					
Venezuela	C	20					
OCEANIA							
Australia	C	27	2				
Hawaii Territory	C	38	4	1			

[1] For the month of November.
[2] For 3 weeks.

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January-September 1942	October 1942	November 1942—week ended—			
				7	14	21	28
AFRICA							
Belgian Congo: Libenge	D	[1] 1					
British East Africa: Kenya	C	1					
French West Africa	C	1					
Gold Coast	C	[2] 3					
Ivory Coast	C	[2] 6	1				
Nigeria	C	1	[1] 1				
Senegal [3]	D	1					
Sierra Leone: Freetown	C	2					
Sudan (French)	D	[4] 2					
Togo	C	1	1				
SOUTH AMERICA [5]							
Brazil:							
Acre Territory	D	4					
Bahia State	D	1					
Para State	D	1					
Colombia:							
Boyaca Department	D	5					
Cundinamarca Department	D	4					
Intendencia of Meta	D	3	1				
Santander Department	D	4					
Venezuela: Bolivar State	C	1					

[1] Suspected.
[2] Includes 2 suspected cases.
[3] According to information dated Feb. 9, 1942, 15 deaths from yellow fever among Europeans have occurred in Senegal.
[4] Includes 1 suspected case.
[5] All yellow fever in South America is of the jungle type unless otherwise specified.

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

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